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Proceedings of the International Colloquium
from Târgu Mureş

10–13 October 2013

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Editor

SÁNDOR BERECKI

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Sándor BERECKI

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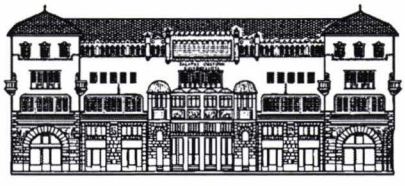

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Contents

J. Vincent S. MEGAW
Preface. Proceedings of the Sixth International Colloquium held at Târgu Mureș 7

Nathalie GINOUX–Dominique ROBCIS–Manuel LEROUX–Florence DUSSERE
Metal Craft and Warrior Elites in the Third Century BC: New Sights from the Carpathian Basin to Gaul 9

Tiberius BADER
Nachbau des Wagens aus dem Fürstengrab von Hochdorf, Deutschland 19

Marcin RUDNICKI
Nowa Cerekwia. A Celtic Centre for Craft and Commerce of Interregional Importance North of the Carpathians 33

Peter C. RAMSL
La Tène Period Craftsmanship in Eastern Austria 71

Ivan DRNIĆ–Ana FRANJIĆ
pXRF Analysis of South Pannonian Late Iron Age Silver Artefacts 83

Marko DIZDAR
Bronze Fibulae with Enamel Inlay from Scordiscan Sites 97

Csilla GÁTI
On the Crossroads of Cultures. Cultural and Trade Connections of the Site of Szajk in South Transdanubia in the Sixth–Fourth Centuries BC 115

Zoltán CZAJLIK
Traces of Prehistoric Smelting Workshops in the Carpathian Basin 139

Károly TANKÓ
Traces of Iron Smelting in La Tène Iron Age Settlement at Ménfőcsanak 147

Attila, HORVÁTH M.
A Decorated La Tène Sword from the Budapest–Csepel Island 161

Katalin ALMÁSSY–Horea POP
Remains of a Pottery Workshop (?) from the Upper Tisza Region 171

Martin FURMAN
A Central European Form of La Tène Ornament: Rings with Three and Four Large Hollow Knobs from Slovakia 183

Gertrúda BŘEZINOVÁ
La Tène Bone and Antler Artefacts from Nitra 191

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János NÉMETI
Pottery Production during the Late Iron Age in North-Western Romania 199

Horea POP
The Metal Smiths' Settlement at Şimleu Silvaniei–Uliul cel Mic 209

Corneliu BELDIMAN–Dan Lucian VAIDA–Diana-Maria SZTANCS–Carmen PAVEL–Florin CONSTANTIN
Composite Artefact Discovered in the Celtic Cemetery of Fântânele–La Gâţa (Bistriţa-Năsăud County). Data on Use-Wear Analysis and X-Ray Computed Tomography 217

Mariana EGRI
Desirable Goods in the Late Iron Age – The Craftsman's Perspective 233

Aurel RUSTOIU–Sándor BERECKI
Celtic Elites and Craftsmen: Mobility and Technological Transfer during the Late Iron Age in the Eastern and South-Eastern Carpathian Basin 249

Iosif Vasile FERENCZ–Dan Lucian VAIDA
Craftsmanship and Crafts in the Transylvanian Celtic Horizon 279

Marija LJUŠTINA–Miloš SPASIĆ
Scordiscan Potters in Action: A Late Iron Age Pottery Kiln from Karaburma 287

Vojislav FILIPOVIĆ–Milica TAPAVIČKI-ILIĆ
Craftsmen in the Celtic Cemetery of Karaburma, Belgrade 297

Andreea DRĂGAN
Production and Circulation of La Tène Painted Pottery North of the Lower Danube 301

Jan BOUZEK
Hook, Lock, Furnace Rake or a Damaged Sickle for Harvesting Olives? 319

ABBREVIATIONS 325

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Preface

Proceedings of the Sixth International Colloquium held at Târgu Mureş

It seems that hardly a month goes by without an archaeological conference of some sort, somewhere. Some of those who attend such meetings my late wife maintained should be called 'conference groupies' and she certainly regarded me as one of those. There is no doubt, however, that very often it is a case that small is beautiful. Certainly the larger gatherings such as the EAA, the European Association of Archaeologists or AFEAF, the Association Française pour l'Étude de l'Âge du Fer give one opportunities to meet people and visit places. However, personally I have gained more from the more restricted gatherings such as Kelti, the meeting of the Slav countries or AG Eisenzeit or, in the last decade, the gatherings at Târgu Mureş. Here, where informality — and low cost! — has brought together young and old, in alternative years being associated to studies of specific aspects of the Bronze and Iron Age has given many the chance to learn at first hand something of the later prehistory of Eastern Europe and the Balkans.

Not only has Sándor Berecki and his small but unstinting group of assistants managed to organise the Colloquium itself but each year seems to have widened still further their net which now extends from France to South Australia but also has managed to gather together the papers to be printed with considerable alacrity by the local publishing house of Editura MEGA (no relation!).

I am looking forward to the next volume. And of course to the next colloquium.

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Metal Craft and Warrior Elites in the Third Century BC: New Sights from the Carpathian Basin to Gaul

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Keywords: craftsmanship, lost wax casting, *cire perdue au renversé*, warrior elite, burial, La Tène shield, ornamented weapons, Plastic Style, copper alloys, Gas-Chromatography, Mass Spectrometry (GC-MS), mineralized wood and textiles

This paper presents the results of the detailed technological analysis of a series of bronze artefacts with cast 'plastic' decoration dating from the first half of the third century BC (LT B2) which refer to contacts as well as to technical and craft transfers between the Oriental and Occidental Celts of the Late Iron Age. The finds are from the Plessis-Gassot–*Bois-Bouchard* (Val-d'Oise) cemetery located in the north of Paris and excavated in 1998 which includes a La Tène cemetery dating from the first half of the third century BC and a dwelling place probably inhabited by the same community but structured later, in the second century BC (Pl. 1). This funeral site was settled overhanging the southern slope of a dry valley, on the same side as the Celtic cemetery of Bouqueval that lies three kilometres away (Guadagnin 1984) and also near the Celtic cemetery of Roissy-en-France (Lejars 2005). The creation and use of the three cemeteries characterized by chariot burials and warrior graves associated with the deposit of some decorated bronze objects dating from the second phase of the 'Plastic Style' are synchronic (Ginoux 2009). The comparative study of the cemeteries' structure, the funeral practices, the material and the funeral assemblages, including the stylistic data, allowed proposing the idea of an influence from the north-western part of the Carpathian Basin on the formation process of the continental Parisii and the mobility of some small heterogeneous groups over a long distance on an East–West axis, that led to a partial repopulation of the current territory of the Île-de-France region in the second quarter of the third century BC. Such a population movement from the Danube region and along the River Seine is also attested in Normandy by the discovery of anklets dating from the second quarter of the third century BC (Leman-Delerive 1987; Ginoux 2007; 2009).

Iron Age Crafts and Craftsmen in the Carpathian Basin, 2014, p. 9–18

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The Plessis-Gassot cemetery has been fully published (Ginoux 2003; 2009). Nevertheless, all the metal objects discovered in the graves is now being systematically restored;[1] this is allowing verification, improving and extending the prior observations made during excavation and the first partial restorations. In this regard, the first artefacts that caught our attention were found in warrior grave no. 1002 (Pl. 2); this contained ceremonial equipment, in particular a shield made of organic materials and decorated with bronze rivets, a scabbard decorated with metal latticework patterns (Ginoux–Ramsl 2014), the hilt of a sword exceptionally adorned (ginoux *et al.* 2006), a toilet kit wrapped up in fine textile on which was identified a lozenge pattern that was totally unknown so far in La Tène period contexts, and two Hellenistic black-glazed cups (*kylix* and *ciotola*) from Northern Etruria, probably the Volterra region, recalling the burial customs of the Cisalpine Celts.

What is most interesting in the discovery of this unique grave in non-Mediterranean Celtic Europe is to reveal the high mobility of the mercenaries and warrior elites who carried their decorated weapons and prestige artefacts in the third century BC, but also of the craftsmen, their ideas and craftsmanship, from Central and Eastern Europe to Gaul (Ramsl 2007; 2011).

Most of the oval-shaped shield (Pl. 2; length: 1.20 m; width: 0.50 m; diameter of the two rivet pairs: 35 and 50 mm) was made from perishable materials: light wooden boards were used for the main section, oak for the *spina* and several layers of leather for the cover. It was most probably placed on the chest of the dead. An iron mount protected the organic material and an iron central rib was fixed upright with small iron nails. Like the main section and the *spina*, the *umbo* and the handle were made from wood. This shield's singularity is in its decoration with four heavy bronze mounts forming two different pairs of rivets, each having a separate function: the big ones fixed the handle and the smaller ones attached the central support's extremities. Apparently, the construction technique and the decoration are the same for all the mounts. Each mount was fixed on a circular bronze support plate with the same diameter as the mounts.

Until now, this disposal of decorated mounts has been mostly attested in the Middle Danube region, in the early Duchcov–Münsingen phase (mid-fourth century BC). The best example of it is the shield discovered in grave no. 14 in Ménfőcsanak cemetery, Hungary (Uzsoki 1970). As for the La Tène period, two examples can be cited: the shield found in grave no. 9 in Letky cemetery near Prague, dating from the third century BC (Drda–Rybova 1995, 93), and the shield unearthed in grave no. 35 in the cemetery of Fère-Champenoise–*Faubourg de Connantre*, Marne (Charpy–Roualet 1991, 207).

Such argument as to the use of perishable materials for all structurally important pieces (the *umbo* and the handle) is not strong enough to consider the shield from Le Plessis-Gassot as a non-functional ceremonial weapon. Indeed, the archaeological sources document a certain number of shields that were entirely made from wood and leather (Kaul 1988; Raftery 1983, 107 no 279, pl. 113), but their heavy metal fittings influence us to consider this discovery to be the prestige attribute of an individual who belonged to the warrior elite and who did not directly participate in hostilities.

In Western Europe the shape of the mounts found at Le Plessis-Gassot cannot be compared to the other La Tène period shield mounts that have been found so far.[2] Nevertheless, there is another bronze mount without context in the Musée des Beaux Arts at Alençon described as a possible 'chariot element' (Duval–Heude 1983, no. 90).

The tripartite division of the mounts' decoration is based on of three spiralling and expanding S-curves. The spiral extremities produce six big doughnut-shaped forms (Ginoux 2009, 94 and fig. 82). The same kind of conception is visible on top of a terret from Paris. A long and almond-shaped eye cleverly placed allows the fleeting evocation of a face (Pl. 3/1). The same process is found exactly on the central element of the bronze round armature from Roissy–*La Fosse Cotheret*; around which the main pattern revolves. Exhibited in the Musée d'Archéologie nationale, Saint-Germain-en-Laye, this has been interpreted as the lid of a wooden container now (Lejars 2005; Emilov–Megaw 2012, 18). The principle of the composition based on S-motifs linking into continuous sequences – one S-motif ending in a tightly curved spirals and the other with the head of a fantastic animal – recalls the spiralling composition of the adornment on the Bouqueval bowl. Other similarities can be found in a number of objects,

1 Conservation headed by Florence Dussère in the Laboratory of the Service départemental d'archéologie du Val-d'Oise (France).

2 The use of similar bimetallic pieces ornamented in Plastic Style is recorded eastward. See for instance Müller 2011; Roska 1933.

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particularly the application of the *métamorphose plastique* process (KRUTA 1992, 835, 15) to the decoration of the Paris and Roissy linchpin heads on which a central mask, developed from the fusion of a simplified Celtic palmette and plant motif, conflates anthropomorphic features with vegetable contours.

This linear conception and the alternating of dark and light on the surface of both mount pairs, as generally in Celtic art, illustrate graphically and three-dimensionally the symbolic concepts of a binary alternation and of two opposite but complementary principles (KRUTA 2010, 245, 249).

The sharp linear design (Pl. 3/2) gives these four pieces a graphical aspect that most decorations belonging to the 'Plastic Style' do not have, since they are closer to a series of bossed forms. Nevertheless, this design technique is identified in the Danube region on artefacts decorated using the pseudo-filigree technique, like the bronze bracelet from Velká Maňa (Slovakia) adorned with fourteen motifs, each representing three cones formed by stacks of swellings (ZACHAR 1987, 297 no. 66). In a widened local context, there are (in some authors' opinion) many points of comparison between the fibula from an inhumation grave from Villeneuve-la-Guyard, Yonne (RAPIN–BARAY 1999) and the mounts found in Le Plessis-Gassot, even if the fibula's forms, less angular than on the shield's mounts, are smoothed by the succession of lines in relief and a beading.

The fantastic animal head with a curved beak belongs to the 'Sword Style' repertoire from the Middle Danube region and from North-East Gaul; this decoration, visible on the reverse side of the iron scabbard found at Cernon-sur-Coole (Marne) and on the bow of one the two fibulae found in Conflans-sur-Seine (Aube) made of iron by the *champlevé* process (KRUTA 1975).

All these discoveries in the central valley of the River Seine have fuelled the debate, not only as to their place of manufacture, but most of all as to the conditions of the quick diffusion of this ornamental stage which can be regarded as the second phase of the 'Plastic Style' when it appears for the first time. The discussion has continued, particularly following the latest publication of the famous and recently re-examined Celtic bronze chariot fittings found in the Hellenistic tomb of Mal-Tepe in Mezek, Haskovo district, Bulgaria (EMILOV–MEGAW 2012).

The decorated mounts from Le Plessis-Gassot were examined in order to examine some technological aspects.[3] The four mounts are hollow and hemispherical. On the reverse, an iron rod of quadrangular section is inserted into an additional reverse cone-shaped thickness of metal located on the axis of the piece. The X-ray examination shows the profile of the rod widening into a dovetail joint (Pl. 4). The mounts' inner linings present an accumulation of matter on their reliefs. Considering these elements, it seems that the iron rods were more likely plated in bronze during the casting process rather than welded afterwards.

Some organic remains that may match the original setting were also identified on certain elements. On the large mount R4399's internal rim (Pl. 3/3), a light brown layer of organic matter was sampled for analysis by gas chromatography – mass spectrometry. A few characteristic peaks were identified (oleana- 11.13 (18) -diene, decarboxyled 7-oxodehydroabietic acid); they match a partially polymerized vegetable substance (possibly some sort of degraded pine resin). On the reverse side of the support plate of one of the two largest mounts, the wood of the shield and some textile traces are mineralized (Pl. 3/4), which suggests that the shield's boards had been covered with fabric on their external side before the metallic fittings were fixed.

Some morphological differences are noticeable between the different mounts, as it is the case for both large ones, even if their masses are relatively close: 96.8g for R4400 and 99.3g for R4399 (despite different alterations between both objects). Moreover, one can notice some significant dimensional variations in the decorative details, such as the flat parts of the spiralled elements (Pl. 3/5–6).

Unlike the first-mentioned theory about the existence of two original patterns for mounts, a large one and a small one, which would have then been re-used twice, a careful examination proved, surprisingly, that each piece presented some specific dimensional characteristics. A new working hypothesis considers that a series of castings from another set of moulds could have been used by the craftsman.

A detailed examination of the surfaces with an optical microscope seems to indicate some reworking after casting, but there is a lack of tool remains, except for some parts of the large mounts where there is chasing dot work on some of its sides. But in this case, it is an intentional decorative surface

3 C2RMF collaborators: Jean Marsac, Elsa Lambert, Juliette Langlois and YannickVandenberghe.

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treatment, including, as the main purpose, a very subtle optical effect emphasizing the three dimensional design (Pl. 3/7–8) by switching between dark (the dotted areas) and light (the burnished parts).

Regarding the technical process, one can say that mounts were made using lost-wax casting techniques from wax patterns created using the *cire perdue au renversé* method. This way, the liquid wax was first poured in the cast, and then the excess of matter poured out until the craftsman got a thin and regular wax film. The mastering of the *cire perdue au renversé* process is perfectly visible from the RX X-ray images (Pl. 4). Indeed, on the one hand, these images allow controlling of the general regularity of the surface proper to lost wax and, on the other hand, observing the typical irregularities of the metallic distribution due to the process: thicknesses are more important in the hollowed zones and thinner in the relief zones of the moulds. The laboratory experimentations on resin moulds showed that the distribution of each mass of wax is similar to the others.

X-Ray Fluorescence Spectrometry and multi-elemental analysis provides further information on the elementary composition of the objects.[4] Having been performed on the corroded surface, these analyses must be regarded as mainly qualitative, since some elements are likely to be under-represented and others over-represented. These analyses reveal a preponderant presence of copper and tin, which indicates a binary composition of bronze. Lead, antimony, silver, gold and arsenic traces are also present (Fréna *et al.* 1997), which primarily indicates that the alloy used to make the four mounts and their backing plates was similar, whereas one could have expected different compositions between both groups.

Here, the set's homogeneity shows its unity; if one considers our observations on the casting process, and the careful surface treatment with a nearly absence of final reworking after casting and, consequently, of the moulding technique, these pieces demonstrate some perfectly completed and extremely well-mastered technical practices.

***

To sum up, it is clear that for something more than a decade, a sudden increase of archaeological finds – some of them are really exceptional – in the northeast quarter of France (in particular the Paris Basin) have improved our vision of trends regarding the circulation of ideas as well as artefacts between the eastern and western Celtic Europe areas, and the existence of related workshops.[5] The Le Plessis-Gassot cemetery certainly offers a key for a better understanding of the mobility of the La Tène social elite network, including both warriors and craftsmen.

In this way, the detailed study of the shield mounts found in Le Plessis-Gassot has highlighted a really homogeneous set showing the unity of this group; and considering the observations on the fabrication using the *cire perdue au renversé* method, the precision and regularity of the surface treatment achieved with a chisel (diameter: 0.3 mm), without overflows, and a near absence of post-casting working, these pieces demonstrate some really completed and extremely well-mastered technical practices. The high standard of craftsmanship also culminates with the production of the initial patterns, undoubtedly in some hard material (wood or bone) considering the sharp edges of the finished castings whether as a sole element or as several assembled elements. Beyond the Celtic world some wooden patterns are known among the Scythians of the Altai region (Hunt Leslie 1980, 70), and further experimental work should validate this hypothesis.[6]

4 Equipment used: Niton XL3T Gold with Ag tube, Electronics Alloys mode, tension of 40 keV, 3mm spot, acquisitions of 60 S., NDT 7.1.2 software – detailed conditions of acquisition and treatments are specified in V. Landeau's internship report *"Mise au point de protocoles d'acquisition pour les alliages cuivreux" (Working out of acquisition protocols for copper alloys)*, C2RMF, 2009.

5 A paper regarding these connections was presented lately by N. Ginoux and P.-C. Ramsl (*Celtic Craftsmanship, From Eastern France to Eastern Austria*) at the 19th Annual Meeting of the European Association of Archaeologists, on 4–8 September 2013 in Pilsen, Czech Republic.

6 This paper was translated by Jennifer Douétil.

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List of plates

Pl. 1. The location of the site. Map of the La Tène settlement and cemetery (drawings: F. Marti and I. Pasquier; after Ginoux 2009).

Pl. 2. Grave no. 1002 (Drawing: N. Ginoux and I. Pasquier; after Ginoux 2009).

Pl. 3. 1. The spiral wrapped and the long and almond-shaped eye on large mount R4399; 2. Small mount no R4397 (M. Leroux); 3. Traces of mineralized fabric are visible on the reverse side of a large mount's support plate; 4. Some organic residues were found in the brown layer (down on the left), on large mount R4399's internal rim; 5. Examples of some morphological differences between both large mounts. The flat parts of the spiralled elements are wider on one mount than on the other (M. Leroux); 6. Micro-measurements of a small mounts' spiral; 7. A small mount's pyramidion on which a matting surface treatment by dot work can be observed, on the left side; 8. Matting surface treatment by dot work on the extremity of mount R4399's spiral. (3–4, 6–8. Digital microscope 3D Hirox KH 8700; D. Robcis).

Pl. 4. X-ray examination (setting) of the small and large pairs of mounts. One can clearly see the additional thickness of the inner linings on their relief patterns (examples are indicated by dark arrows), but also on the fixing zone of the reverse cone-shaped iron rod (examples are indicated by light arrows) (J. Marsac, E. Lambert).

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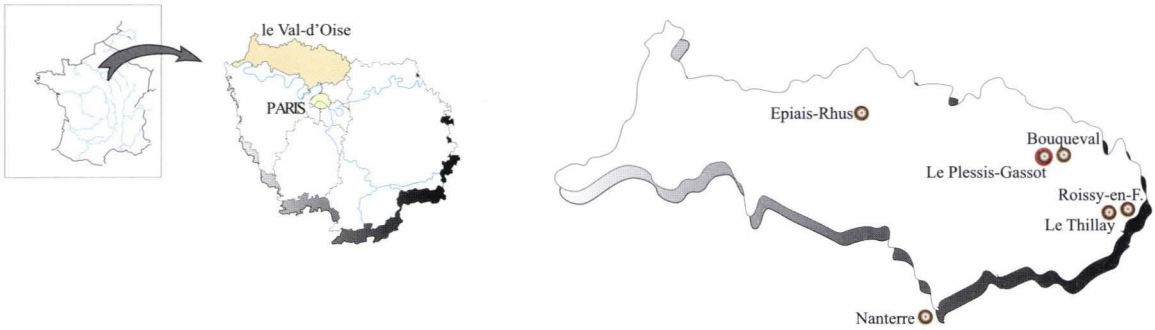

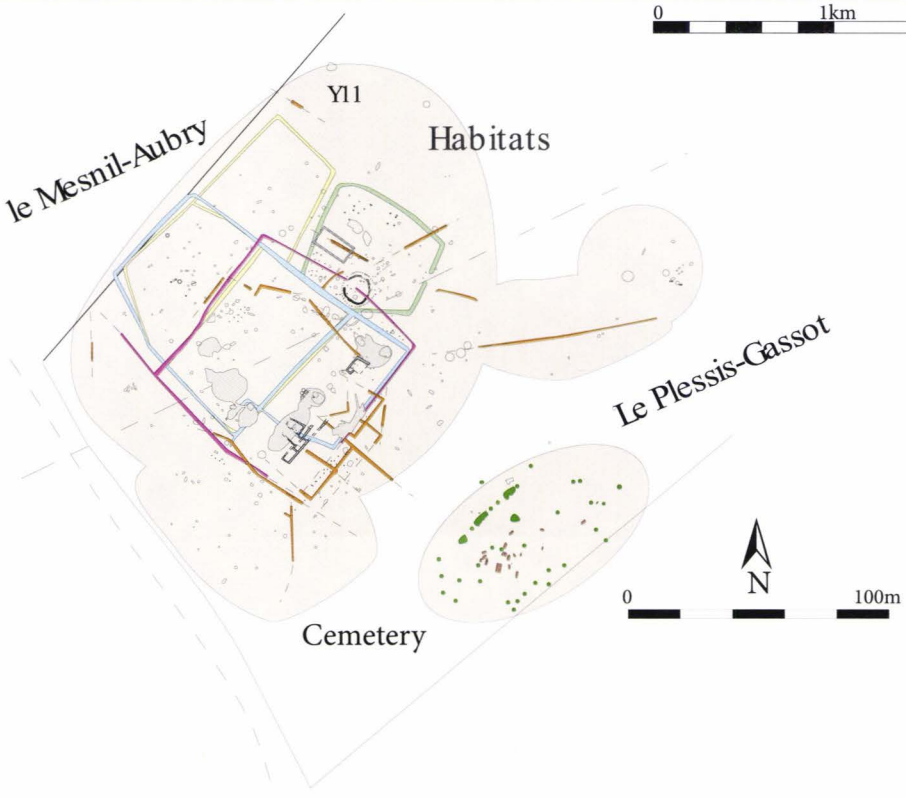

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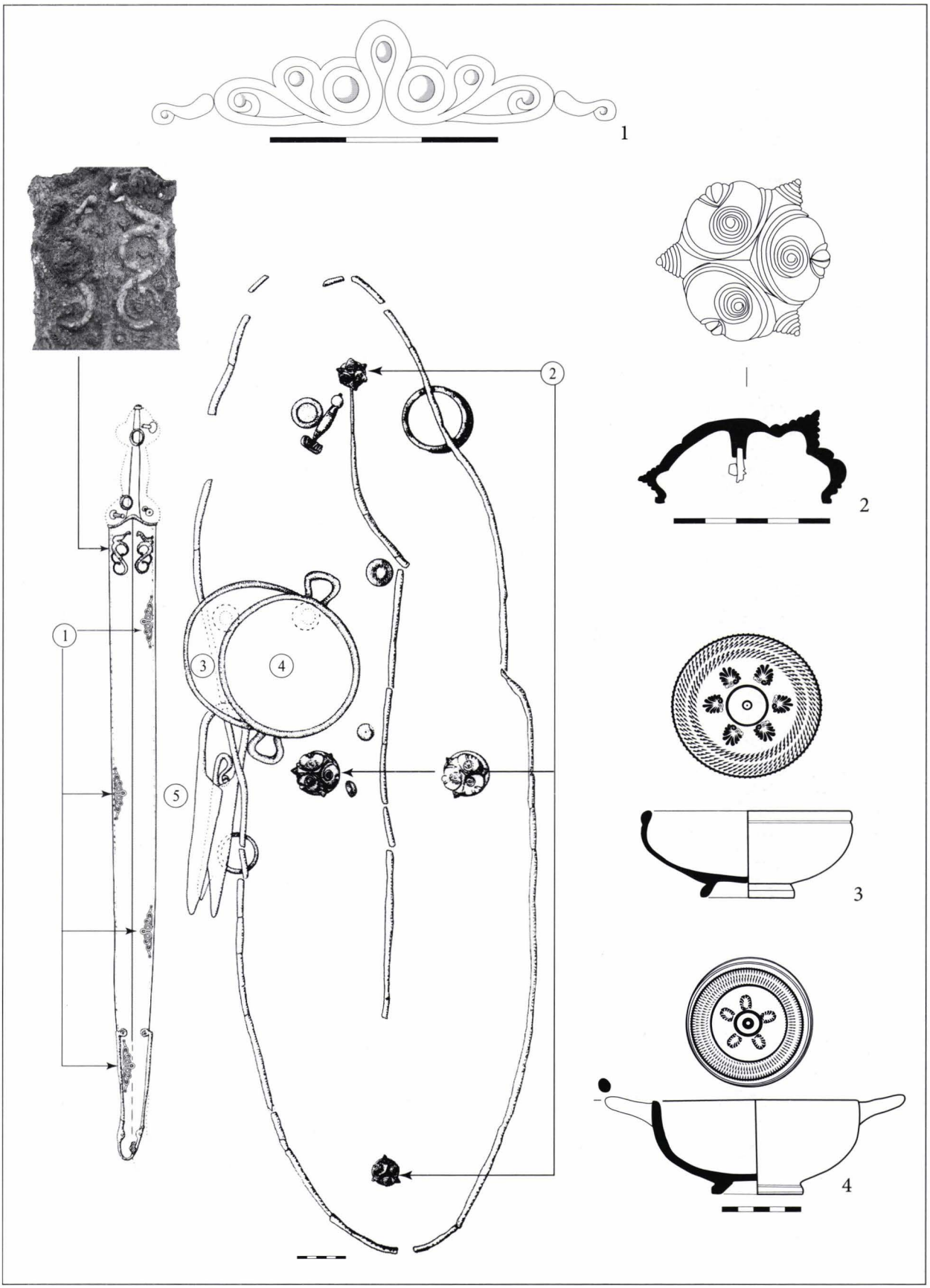

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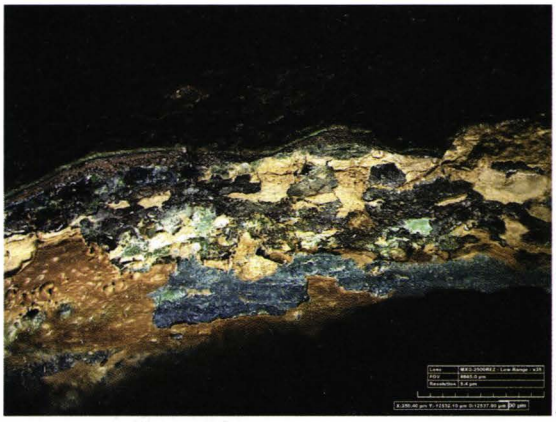
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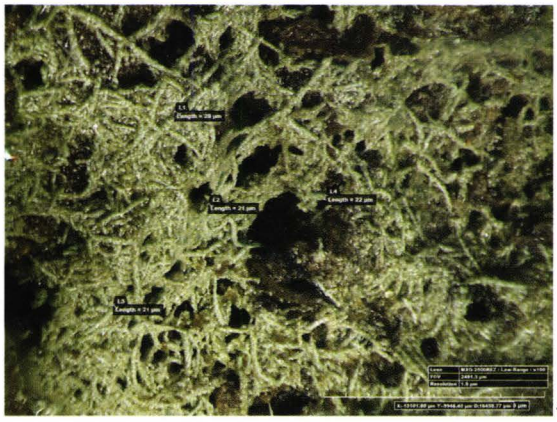
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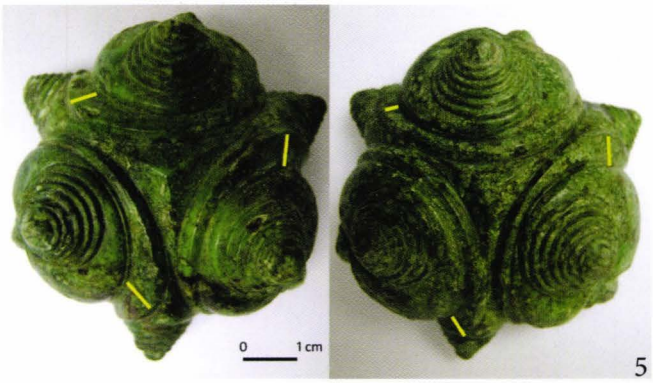

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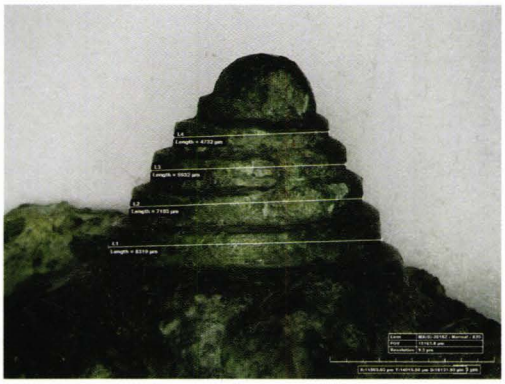
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8

Plate 3. 1. Large mount R4399; 2. Small mount no R4397; 3. Traces of mineralized fabric; 4. Organic residues on large mount R4399; 5. Examples of some morphological differences; 6. Micro-measurements of a small mount's spiral; 7–8. Matting surface treatment by dot work. (3–4, 6–8. Digital microscope 3D Hirox KH 8700; D. Robcis).

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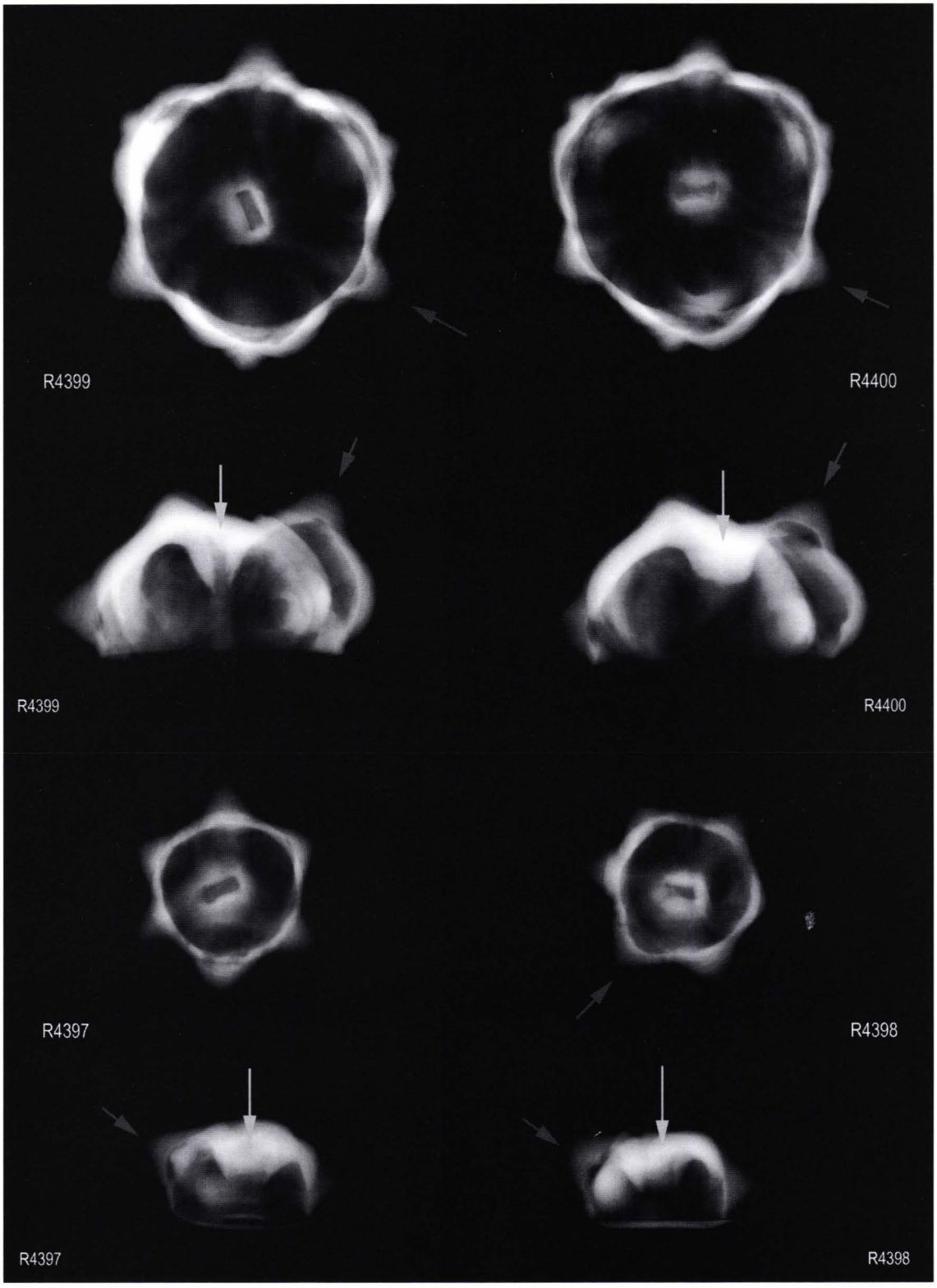

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NACHBAU DES WAGENS AUS DEM FÜRSTENGRAB VON HOCHDORF, DEUTSCHLAND

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Schlüsselwörter: Fürstengrab, Ausgrabung, Dokumentation, Restaurierung, Rekonstruktion, Nachbau

Der Ort Hochdorf/Enz, Gemeinde Eberdingen, Landkreis Ludwigsburg, Land Baden-Württemberg liegt etwa 20 km nordwestlich der Landeshauptstadt Stuttgart. Nach der Verwaltungsreform von 1975 wurden die drei Orte Eberdingen, Hochdorf und Nussdorf, die bis dahin unabhängige Gemeinden waren, zu einer einzigen Gemeinde mit dem Namen Eberdingen zusammengeschlossen.

Die Landschaft um den Ortskern Hochdorf, am Westrand des Strohgäues, bildet eine kleine, verhältnismäßig abgeschlossene Siedlungskammer, die sich nach Osten zum Glemstal und nach Norden zum Enztal öffnet. Nach Westen und nach Süden ist der Ort durch Höhenzüge, teilweise mit Wald bedeckt, eingefasst. Der Name des Ortes taucht erstmals im Jahre 811 in den Quellen auf.

Die ersten archäologischen Untersuchungen in der Gemarkung fanden vor dem Ersten Weltkrieg statt. Nordwestlich des Ortes liegt im Wald „Pfaffenwäldle" eine Gruppe von 24 Hügeln, einige davon mit einem Durchmesser von 26 m. Elf Hügel wurden 1911 von Freiherr von Tessin ausgegraben. Die Bestattungen beginnen in der späten Hallstattzeit und setzen sich bis in die frühe Latènezeit fort (BADER 1995, 182–187).

Die reiche bodendenkmalpflegerische Tätigkeit in Baden-Württemberg war eine wichtige Voraussetzung für die Entdeckung des frühkeltischen Fürstengrabes aus der Späthallstattzeit in Hochdorf. Jedoch war die Entdeckung des unbekannten Fürstengrabes, östlich vom Ort in der Flur „Biegel", eine große Sensation der südwestdeutschen Archäologie. Der einzeln gelegene Großgrabhügel war in den vergangenen 2500 Jahren durch intensive Beackerung und Erosion eingeebnet worden. Die Reste des Hügels, eine noch 1,5 m hohe Geländekuppe, und Steine aus dem Steinkranz des Hügels wurden von der Historikerin Renate Leibfried aus Hochdorf 1968 entdeckt. Die Grabungen führte in den Jahren 1978 und 1979 J. Biel vom Landesdenkmalamt Stuttgart durch.

Der ehemals riesige, stark verschleifte Großgrabhügel mit 60 m Durchmesser und 6 m Höhe war von einem Steinkreis eingefasst, in welchem Holzpfosten eingegraben waren (Taf. 1/1). Das Zentralgrab lag in der Mitte des Hügels in einer Grabgrube, die eine innere eigentliche und eine äußere Holzgrabkammer hat (Taf. 1/2). Der Raum zwischen den beiden Holzkammern war mit großen Steinblöcken gefüllt. Diese starke Holz-Steinkonstruktion hat vermutlich das Aufbrechen der Kammerdecke verhindert. Jedenfalls war das Zentralgrab des Fürstengrabes von Hochdorf unberaubt, im Gegensatz zu den meisten anderen Fürstengräbern der westlichen Hallstattkultur (BIEL 1985). In der Grabkammer war ein etwa 40–50 jähriger 1,83 m großer Mann bestattet.

Ein vierrädriger Wagen, der fast vollständig mit verzierten Eisenblechen überzogen ist, lag im Ostteil des Grabes und nimmt die volle Kammerlänge ein. Die lange, nach Süden weisende Deichsel

Iron Age Crafts and Craftsmen in the Carpathian Basin, 2014, p. 19–32

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stößt an der Kammerwand an, der langrechteckige Wagenkasten ist an seiner Eisenverzierung erkennbar. Die Räder sind stehend zusammengebrochen (Taf. 2/1). Der Wagen war also fahrbereit ins Grab gestellt worden (Biel 1985, 50 Abb. 32, Taf. 5b; Biel 1987, 121–128, Taf. 34; Koch 2006, 16–33 Abb. 1–20) (Taf. 2/2). Auf dem Wagenkasten befand sich: ein Doppeljoch aus Holz mit reichem Bronzezierrat, darunter zwei bronzene Pferdefiguren, zwei Eisentrensen, ein langer Stachel aus Holz mit Bronzegriff und Eisenspitze, neun Teller, drei Becken, eine Eisenaxt und ein großes Eisenmesser. Der Wagen war beim Einbruch der Kammerdecke besonders stark zerstört worden. Durch die Wucht der herunterbrechenden Steinmassen ist er auf fünf Zentimeter Stärke zusammengedrückt worden. Nach der Grabung wurden Räder, Deichsel und Kasten des Wagens einzeln eingegipst und ins Labor des Landesmuseums Stuttgart transportiert. (Nach der Meinung einiger Restauratoren und Forscher wurden das Untergestell des Wagens bzw. Langfuhr/Wagenbaum und die zwei Achsen mit dem dazugehörigen Achsblock – deren Spuren nicht gefunden wurden – nicht ins Grab gelegt). Erst wurde eine starke Röntgenaufnahme (Universität Stuttgart) gemacht, danach folgte die Freilegung und Bergung der zerstörten Teile, sowie die Restaurierung, die mehrere Jahre in Anspruch nahm (Koch 2006, 65–78, Abb. 56–87). Der restaurierte Wagen von Hochdorf ist jedenfalls ein außerordentlich beeindruckender Fund der Hallstattzeit (Taf. 2/3).

Die gut gelungene Restaurierung war eine Voraussetzung für den Nachbau des Prunkwagens, der besonders gut die Arbeitsweise der experimentellen Archäologie verdeutlicht.

Die Untersuchungen ergaben Hinweise auf die Herstellungsart sowohl der Holzkonstruktion als auch der Eisenverkleidung. Aufgrund der Bearbeitungsspuren am Metall der Originalstücke konnte man ehemals verwendete Werkzeuge, wie Hämmer und Punzen, wiedererkennen. Metallanalysen zeigten, dass für die Herstellung des Wagens Eisenblech aus Weicheisen verwendet wurde. Deichsel und Außenseite des Wagenkastens sind mit mehr als 1320 Einzelteilen aus Eisenblech verziert. Zudem sind nahezu 800 dieser Bleche mit punzierten Rillen aufwendig geschmückt.

Für die Eisenbeschläge des Hochdorfer Wagens dienten Spitzbarren als Rohmaterial, die durch mehrmaliges Ausschmieden zu Blech verarbeitet wurden. Daraus konnten die benötigten Einzelteile mit Meißel, teilweise mit Hilfe von Schablonen, in die gewünschte Form geschmiedet, wenn nötig feuerverschweißt und schließlich mit Punzen verziert werden.

Außerordentlich wichtig war die Zusammenarbeit zwischen dem Wagner Wilfried Müller von der Kutschenmanufaktur Kühle, Haiterbach und dem Kunstschmied Gerhard Längerer, Renningen. Da noch Reste der Hölzer an verschiedenen Bruchstücken der Eisenverkleidung angerostet waren, konnten Räder, Wagenkasten und Deichsel originalgetreu rekonstruiert werden, und demnach bereitete auch der Nachbau keine besondere Schwierigkeit. Untergestell, Räder und Achsen bestanden ausschließlich aus Holz. Die Metallbeschläge dienten zur Stabilisierung und auch zur Verzierung des Wagens. Die Rekonstrukteure des Wagens, unter der Leitung von Jörg Biel, haben zwei Holzachsen aus der urnenfelderzeitlichen Siedlung „Wasserburg" von Buchau als Vorbild genommen, um das Fahrgestell des Hochdorfer Wagens zu rekonstruieren. Bei diesem wichtigen Fund sind die Löcher der Achsennägel und im Mittelblock die Aussparungen für die „Gabeln" ohne Nagelloch in der Mitte zu erkennen (Kimmig 1992, 60–62, Taf. 37/1, 2). Die Mannschaft hat den Wagen nach diesem Vorbild mit starrer Vorderachskonstruktion rekonstruiert bzw. nachgebaut. J. Biel begründete folgendermaßen, warum der Wagen keine drehbare Vorderachse hatte:

a.) Der Wagenkasten müsste so weit von den Achsen abgehoben werden, dass die Räder beim Einschlagen unter ihm Platz haben, so dass sie nicht schon bei einem Winkel von 20 Grad an ihm anstoßen würden;

b.) Hinweise für einen Drehschemel und Drehstachel wurden nicht gefunden, Eisen oder Holzdrehpunkt und Nagel für die Deichsel sind nicht erhalten, wie bei den Wagen von Hohmichele, Bell und Vix;

c.) Es gab keine Hinweise für ein Langfuhr oder einen Wagenbaum, der die beiden Achsen zusammenhält. Der Wagenkasten von Hochdorf war jedoch so stabil, dass er die beiden Achsen ohne Langfuhr zusammenhalten konnte (Biel 1987, 127–128). Eine Bemerkung dazu: Auf der Rückenlehne der Totenliege (Kline) ist ein Wagen mit Langfuhr dargestellt, was doch nicht das Vorbild für den Hochdorfer Wagen dienten sollte (Taf. 2/4).

Der Kunstschmied Längerer hat uns weitere Argumente, die für eine starre Vorderachse sprechen, gegeben:

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a.) Der Achsabstand ist so kurz, dass fast auf der Stelle gedreht werden kann;

b.) die Deichsel ist so konstruiert, dass man ohne weiteres einen Seitendruck anbringen kann, da die Deichsel horizontal doppelt so breit ist, wie vertikal;

c.) die Gewichtsbelastung auf der Ladefläche mit einem daumendicken Holzrost hat höchstens 150 kg betragen.

Jedoch ist diese Vorderachsenrekonstruktion alleinstehend. Alle anderen hallstattzeitlichen Wagen, Ohneheim (Egg 1987, 77–102, Farbtaf. III, IV, Taf. 6–22), Vix (Egg–France-Lanord 1987, 145–179, Farbtaf. X, XI, Taf. 38–64), Bell (Joachim 1987, 135–143, Taf. 35–37), Býči Skála (Barth 1987, 103–119, Farbtaf. V, Taf. 23–33), Großeibstadt (Uenze 1987, 69–75, Taf. I, II, Taf. 2–5) usw. wurden mit drehbarer Vorderachse rekonstruiert (Für die Rekonstruktion vierrädriger Wagen S. Hayen 1991). Die Rekonstruktion ist auch unter den Wagenspezialisten nicht unumstritten (Pare 1987, 128–133; Koch 2006, 211–219, Abb. 189–190). Entgegen aller Erwartungen ist der Hochdorfer Wagen trotz starrer Vorderachse lenkbar. Eine Vorführung, ein Fahrversuch auf dem Gelände des Museums mit dem nachgebauten Fuhrwerk, hat die Fahrtüchtigkeit bewiesen. Die Lenkbarkeit war mit einem Radius von etwa 10 m möglich, wegen der starken Scharnierkonstruktion und durch die 2,38 lange Deichsel, die vertikal beweglich ist. Der starke Seitendruck, der bei der Fahrt mit der starren Achse entsteht, wurde durch den stabilen Deichselbaum mit längsovalem Querschnitt aufgefangen (das Zweite Deutsche Fernsehen hat die Vorführung aufgenommen und später in einer zehnminütigen Sendung gezeigt).

Nach den von Udelgard Körber-Grohne von der Universität Stuttgart vorgenommenen Bestimmungen wurde ursprünglich für die Holzkonstruktion des Wagens vorwiegend Ulmenholz, z. T. aber auch Esche und Ahorn verwendet, was beim wieder aufgebauten Wagen berücksichtigt wurde. So bestanden die Vorderradfelgen aus Esche, die der Hinterräder aus Ulme, die Speichen aus Ahorn und Ulmenholz, die Naben aus Ulmenholz, der Wagenkasten aus Esche, die Deichsel aus Apfel- oder Birnbaumholz. Eine bemerkenswerte technische Leistung der hallstattzeitlichen Wagner sind die Felgen, die trotz ihrer Stärke aus einem einzigen Span zusammengebogen waren. Nach der Herstellung der einzelnen Metall- bzw. Holzteile des Wagens kam die abschließende Montage, die eine enge Zusammenarbeit zwischen Wagner und Schmied voraussetzte. Das Verkleiden der Naben oder das Aufziehen des Felgenspans sind außerordentlich komplizierte Vorgänge, welche eine entsprechende Spezialisierung der beiden Handwerkszweige belegen.

Die Rekonstruktionsarbeit bzw. der Nachbau des Wagens wurde schrittweise zwischen Ende 1988 und Anfang 1991 durchgeführt und kostete für das Keltenmuseum 220.000 DM. Das Speichenrad aus Holz besteht aus einer zylindrischen Nabe, zehn Speichen und dem aus einem Stück gebogenen Felgenspan (Taf. 3/1–2). Der Wagner hat die Felgen für die vier Räder aus je einem 2,8 m langen und 8 cm starken Holzspan aus Esche bzw. Ulme unter Dampf zu einem Rund gebogen. Zusätzlich werden die Felgen noch stärker gebogen, als es dem späteren Durchmesser entsprach, damit Nabe und Speichen allein durch die Spannung der Felge zusammengehalten werden. Die Stöße bzw. die Spanenden wurden schräg zugerichtet, so dass sie sich beim Zusammenbiegen der Felge stark überlappen, und mit einem kleinen Holzdübel befestigt (Taf. 3/3). Wegen der starken Spannung muss man die Felge beim Einsetzen der Speichen mit einer speziellen Hebelkonstruktion wieder auseinander drücken. (Taf. 3/4). Die zehn aus Ahorn gedrechselten Speichen sind konisch und verjüngen sich von 4,6 auf 3,8 cm. Sie wurden in Bohrungen an Nabenbrust und Felge eingezapft (Taf. 3/5). Die 46 cm langen Naben hat der Wagner aus drei Ulmenbrettern hergestellt bzw. zusammengesetzt, verdübelt und verleimt, um das „Arbeiten" des Holzes zu verhindern. Aus diesem so verarbeiteten Holzstück drechselte der Handwerker die zylinderförmige Nabe mit stark verbreiterter und profilierter Nabenbrust. Auf die beiden verlängerten Nabenhälse wurden die beiden Nabenköpfe – wegen der Eisenverkleidung – als hohle Zylinder, extra gefertigt (Taf. 3/7). Später in der historischen Zeit und auch heute war und ist es üblich, den Nabenkopf zusammen mit anderen Teilen der Nabe aus einem Holzstück zu drechseln. Auf dem Mittelteil der Nabe wurden die Löcher für die Zapfen der Speichen vorgebohrt, für die Achse wurde ein Loch längs durch das Zentrum der Nabe gebohrt.

Die Montage des Rades ist sehr kompliziert, denn beim Zusammenbauen von Nabe, Speichen und Felge müssen ja gleichzeitig die ganzen eisernen Beschläge angebracht werden. Die einzelnen Radelemente wurden vollständig mit Eisenblech überzogen und dann zusammengesetzt. Die Felgenbleche und Zierbänder sind von einem profilierten Ring überdeckt, der mit kleinen Nägeln

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im Holz befestigt ist. Die Felgen sind von insgesamt 20 U-förmigen konzentrisch gebogenen Blechen bedeckt (Taf. 3/6). An die kleinen Bleche (8 cm) wurden runde Stutzen zur Aufnahme der Speichen ausgeschmiedet. Die längeren Bleche sind an den Fugen und in den Zwischenräumen mit Zwingen versehen. Die Bänder sind mit Punzen verziert. Die Speichen wurden mit einem 26 cm langen zusammengebogenen Blechrohr verkleidet (Taf. 4/1). Sechs punzverzierte Zwingenringe halten die Röhren, die ebenfalls mit Rillenbändern verziert sind (Taf. 4/3). Auf die Holznabe wurden fünf zylindrische punzverzierte Eisenblechelemente sog. Blechmanschetten, aufgeschoben (Taf. 4/2). Die Nabenbrust mit den Speichenansätzen ist mit einem Blechring mit 10 runden Stutzen versehen (Taf. 4/4). Auf die Felge wurde ein feuerverschweißter eiserner Radreif (3,3 cm breit, 0,5 cm stark) aufgezogen (Taf. 4/6). Der Reif wurde stetig durch das Feuer gezogen, bis er gleichmäßig erhitzt war (Taf. 4/5). Dann konnte man den Reif mit Zange und Hämmer auf das waagerecht liegende Rad aufziehen (Taf. 5/1). Beim Abkühlen zieht sich der Eisenreif etwas zusammen und sitzt fest auf der hölzernen Felge. Dieses Verfahren wird noch heute in den Schmiedewerkstätten verwendet. Entlang der Innenseite des Reifen wurden zwei umlaufende, spitze Nasen ausgeschmiedet, die sich beim Zusammenziehen ins Holz drückten und für seitlichen Halt sorgten. Von außen wurden großköpfige Nägel durch den Reif in die Felge geschlagen. Jeder zweite Nagel ist länger und sitzt in einer Speiche. Nach dem Aufziehen/der Montage des Rades auf die Achse wurde die Nabenkappe aufgeschoben (Taf. 5/2–3), der Achsnagel eingesteckt und der Wagen bzw. das Rad war fahrtbereit (Taf. 5/4).

Wie ich schon erwähnte, hat sich in Hochdorf keine Achse erhalten, so dass man für die Rekonstruktion des Fahrgestells auf die hölzernen Achsen von Bad Buchau zurückgreifen musste. Auf der Oberseite der Achsen aus dem Federsee sind zwei „Aussparungen" bzw. Einschnitte eingearbeitet. Darauf – nach Längerer – müssen zwei gabelähnliche bzw. u-förmige Gegenstücke (Gabel) gesessen haben, sogenannte Reiter (Längerer), die ihrerseits in ein Brett eingezapft waren (Längerer 1996, 35–37). Je ein Brett mit darunter sitzenden Reitern baute man an den Enden des rahmenförmigen Wagenkastens ein (Taf. 5/5). Hier muss erwähnt werden, dass ein Timm, den Buchauer Wagen nachgebaut hat und diese „Aussparungen" bei der hinteren Achse als Einschnitte für den Wagenbaum und bei der vorderen Achse für die Deichselgabe interpretiert hat (Schöbel 2001, 43). Für die Lösung mit „Reiter" von Längerer spricht die Tatsache dass die „Aussparungen" bzw. die Einschnitte in der Achse gerade (90° auf die Achsenlinie) und nicht schräg liegen. Allgemein, auch heute ist das Ende des Langfuhrs V-förmig, wenn er aber beim Buchauer Wagen u-förmig gewesen war, dann fällt die Längerer-Lösung aus.

Die Rekonstrukteure des Hochdorfer Wagens haben den Wagen ohne Wagenbaum rekonstruiert. Zu erwähnen ist, dass eine Darstellung auf der Kline den Wagen mit Wagenbaum zeigt (Taf. 2/4), was nicht unbedingt für die Rekonstruktion verbindlich ist. Den rechteckigen, 171 cm × 68 cm großen Wagenkasten hat der Wagner aus Ulmenbalken (5,5 cm × 6,5 cm stark, 8,5 cm hoch) gebaut. An den vier Ecken hat der Kasten zwei doppelte Verzapfungen und er sitzt mittels der erwähnten Gabel auf dem Achsblock. Beide 170 cm langen Achsen sind aus einem Eichenholzstück gearbeitet. Das Deichselscharnier (Taf. 5/6) wurde mit Hilfe von zwei Zugarmen mit der Vorderachse starr verbunden, also war die vordere Achse nicht drehbar. Auf dem Boden des Wagenkastens liegt ein Geflecht aus Haselruten – beim Original waren es Eschenruten. Auf diesem federnden Geflecht konnte man relativ bequem sitzen oder sogar stehen. Der Kasten ist auf der Außenseite mit fünf teils punzierten Eisenblechstreifen verziert. Sie bestehen aus fünf unterschiedlich breiten Bändern (Taf. 5/7). Der obere Rand des Wagenkastens ist mit profilierten Halbkugeln verziert. Die winkeligen Eckbleche auf der Außenseite sind ebenfalls mit 18 Halbkugeln verziert. Auf den vier Ecken sitzen je vier größere Halbkugeln (Taf. 6/1). Die 238 cm lange, vertikal bewegliche Deichsel (Taf. 6/2) hat der Wagner stabil mit längsovalem Querschnitt gearbeitet. Für die Herstellung der einzelnen Metallelemente des Wagens hat der Kunstschmied Längerer in seinem Schmiedewerkstatt von Renningen (Nachgebaute Werkstatt im Keltenmuseum; Taf. 6/3) eine Serie von Schablonen und Werkzeugen, wie Punze, Meißel, Eintreibdorn, Stemme, Hammer, Amboss usw. geschaffen (Taf. 6/4).

Gegen Ende der Urnenfelderzeit veränderte sich die Wagenbautechnik. Wurden die Räder und Wagenteile in der Bronzezeit noch massiv gegossen, so werden sie – wie wir gesehen haben – in der Hallstattzeit teilweise oder ganz mit Eisen, oder Bronzeblech beschlagen (Taf. 7/1–2). Erhalten sind in den Gräbern meist eiserne Radreifen und Bronzeblechverkleidungen der Naben. Diese

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vierrädrigen Wagen fanden rasch Verbreitung und sind als ausgesprochene Prunkwagen Grabbeigabe der Oberschicht geworden (Taf. 7/3). Mit ihren besonders aufwendigen und kostbaren Verkleidungen sind sie Spitzenerzeugnisse des Wagner- und Feinschmiedehandwerks und zeugen von überraschend hohem technischen Niveau. Die fast vollständige Eisenblechverkleidung des Wagens von Hochdorf stellt im 6. Jh. v. Chr. einen Höhepunkt frühkeltischer Feinschmiedetechnik dar.

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Liste der Tafeln[1]

Taf. 1. 1. Der wieder aufgeschüttete Großgrabhügel von Hochdorf; 2. Der Plan des Hügels mit der Grabkammer.

1 Abbildungsnachweis: Archiv des Keltenmuseums Hochdorf/Enz, Archiv G. Längerer, Renningen.

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Taf. 2. 1. Plan der Grabkammer mit der Lage des Wagens im Grab (nach Biel 1985); 2. Rekonstruktion der Grabkammer mit dem Wagen (nach Biel 1985); 3. Der rekonstruierte Wagen von Hochdorf; 4. Darstellung eines Wagens auf der Rücklehne der Totenliege (Kline) aus der Grabkammer Hochdorf.

Taf. 3. 1. Speichenrad des Wagens; 2. Speichenrad des Wagens (nachgebaut); 3. Die abgeschreckten Enden der Felge sind mit Holzdübel befestigt; 4. Mit einer speziellen Hebelkonstruktion ist die Felge auseinandergedrückt; 5. Die Speichen des Rades; 6. Die Felgen des Rades sind mit U-förmigen Blechen bedeckt; 7. Die Herstellung der Nabe.

Taf. 4. 1. Verkleidete Speichen und Nabe; 2. Verkleidete Nabenbrust, Nabenhals und Nabenkopf; 3. Punzverzierte Zwingenringe halten die Röhren zusammen; 4. Nabenblechring mit Stutzen für die Speichen; 5. Der Reif wurde durch das Feuer gezogen; 6. Herstellung des Radreifes durch Feuerschweißen.

Taf. 5. 1. Aufziehen des Felgenspans; 2. Die Nabenkappe; 3. Die Nabenkappe sitzt auf der Achse; 4. Das Rad ist fahrtbereit; 5. Vordere Seite des Wagens mit Scharnierkonstruktion und Achsblock mit dem „Reiter"; 6. Das Deichselscharnier; 7. Die Verzierung der Außenseite des Wagenkastens.

Taf. 6. 1. Die vier Wagenkastenecken wurden mit Halbkugeln verziert; 2. Deichsel, Achse mit dem Wagenkasten; 3. Nachgebaute Schmiedewerkstatt im Keltenmuseum Hochdorf/Enz (Teilaufnahme, S. Stork); 4. Schablonen und Werkzeugen für die Herstellung der einzelnen Metallelemente des Wagens (Keltenmuseum Hochdorf, Aufnahme S. Stork).

Taf. 7. 1–2. Bronzeblech dominierte bei der Verkleidung des Wagens; 3. Der Wagen ist fast fertig; 4. Der nachgebaute Prunkwagen des Fürstengrabes von Hochdorf; 5. Der nachgebaute Wagen im Grab.

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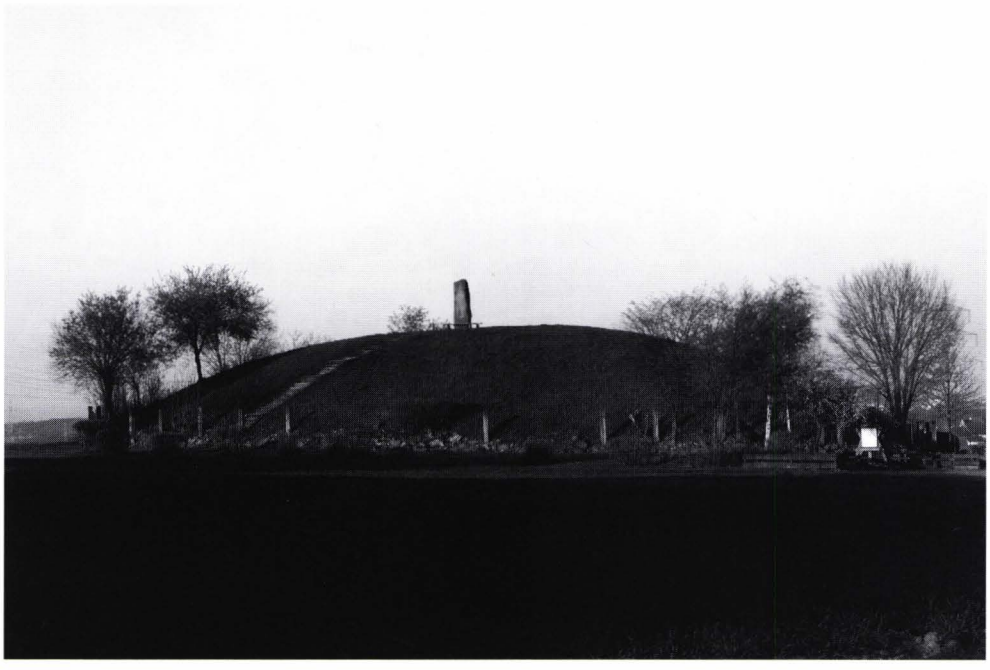

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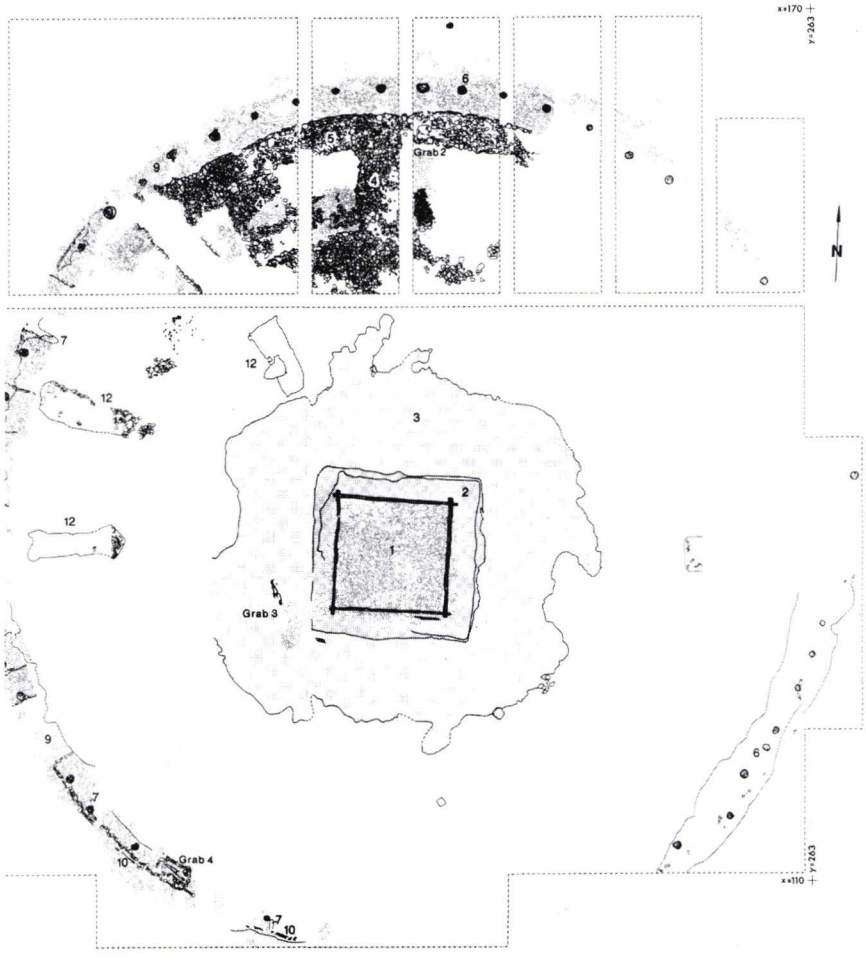

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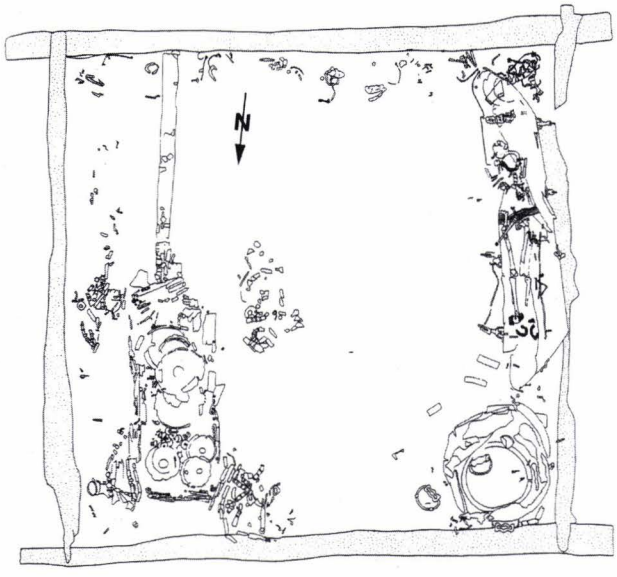

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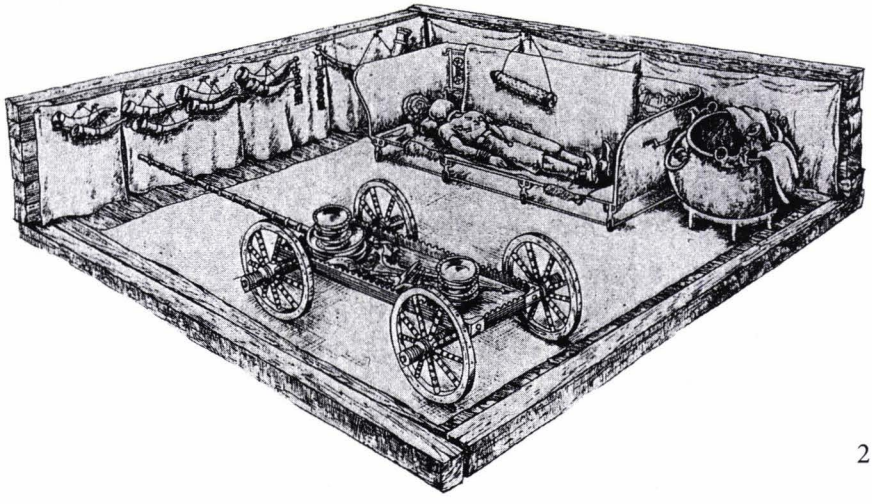

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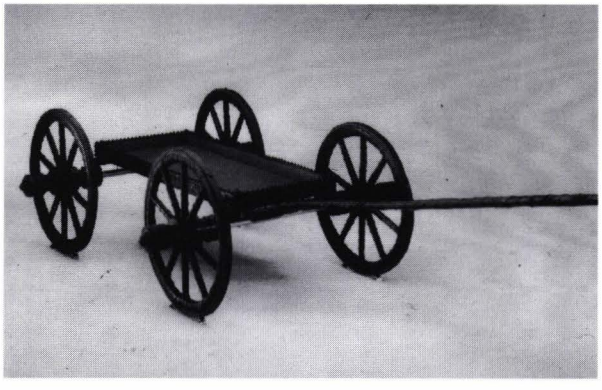

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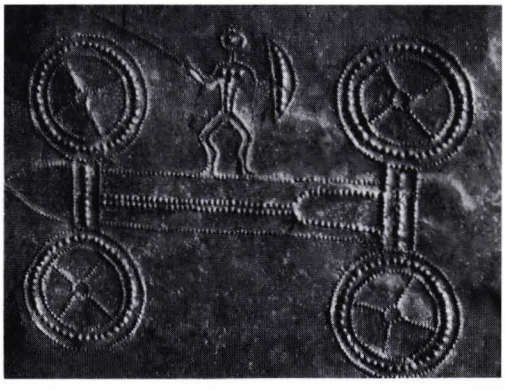

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Tafel 2. 1. Plan der Grabkammer mit der Lage des Wagens im Grab (nach Biel 1985); 2. Rekonstruktion der Grabkammer mit dem Wagen (nach Biel 1985); 3. Der rekonstruierte Wagen von Hochdorf; 4. Darstellung eines Wagens auf der Rücklehne der Totenliege (Kline) aus der Grabkammer Hochdorf.

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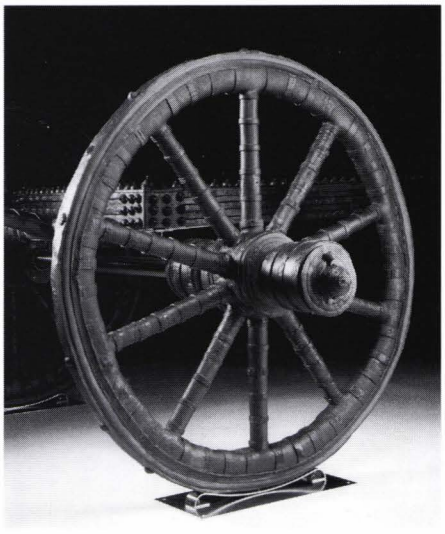
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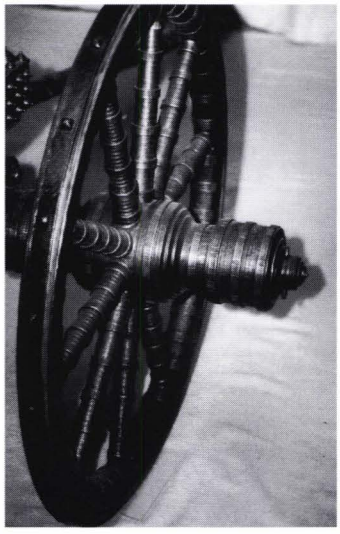
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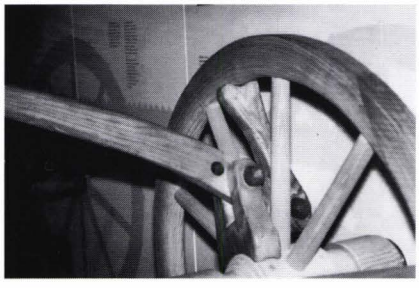
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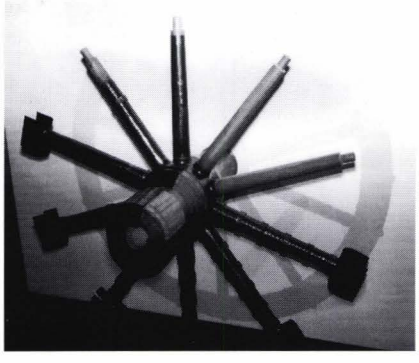
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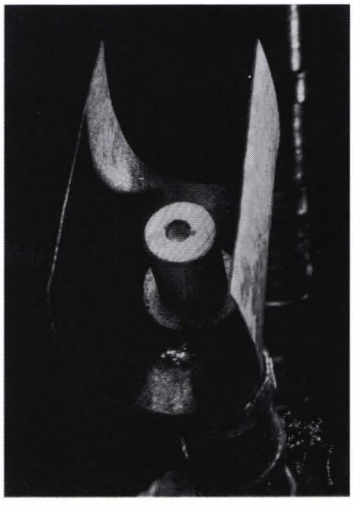
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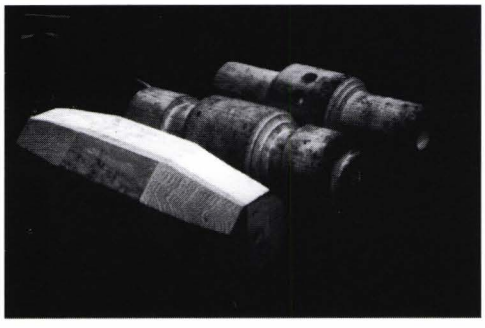
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Tafel 3. 1. Speichenrad des Wagens; 2. Speichenrad des Wagens (nachgebaut); 3. Die abgeschreckten Enden der Felge sind mit Holzdübel befestigt; 4. Mit einer speziellen Hebelkonstruktion ist die Felge auseinandergedrückt; 5. Die Speichen des Rades; 6. Die Felgen des Rades sind mit U-förmigen Blechen bedeckt; 7. Die Herstellung der Nabe.

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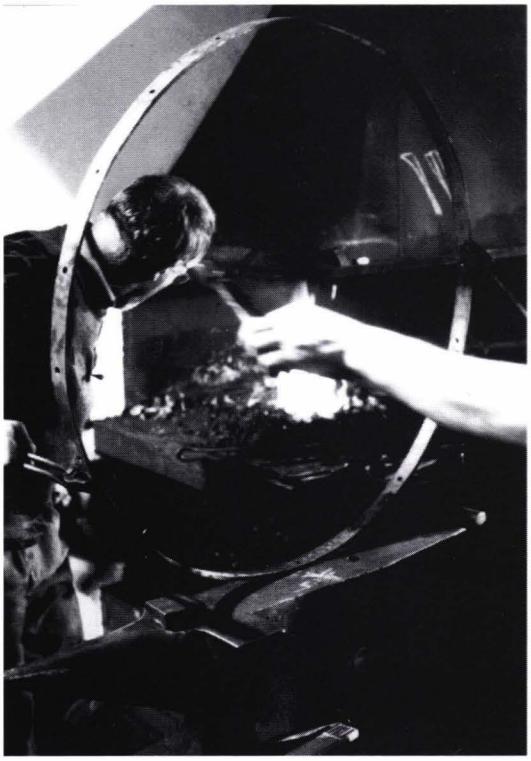

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Tafel 4. 1. Verkleidete Speichen und Nabe; 2. Verkleidete Nabenbrust, Nabenhals und Nabenkopf; 3. Punzverzierte Zwingenringe halten die Röhren zusammen; 4. Nabenblechring mit Stutzen für die Speichen; 5. Der Reif wurde durch das Feuer gezogen; 6. Herstellung des Radreifes durch Feuerschweißen.

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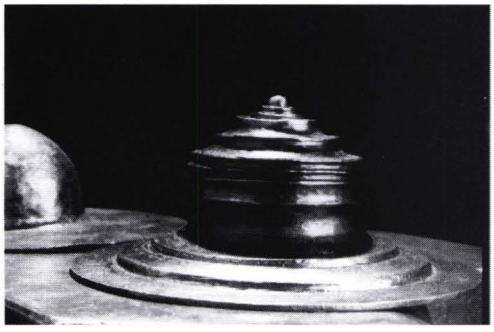
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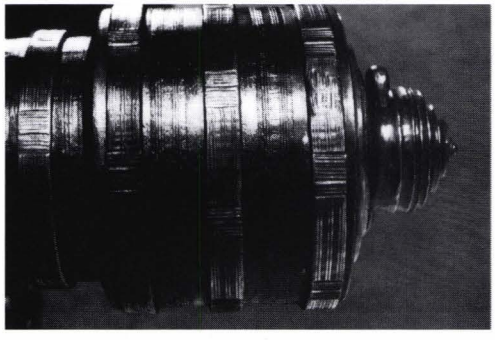
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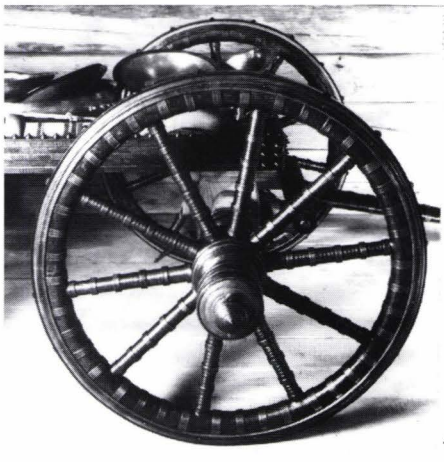
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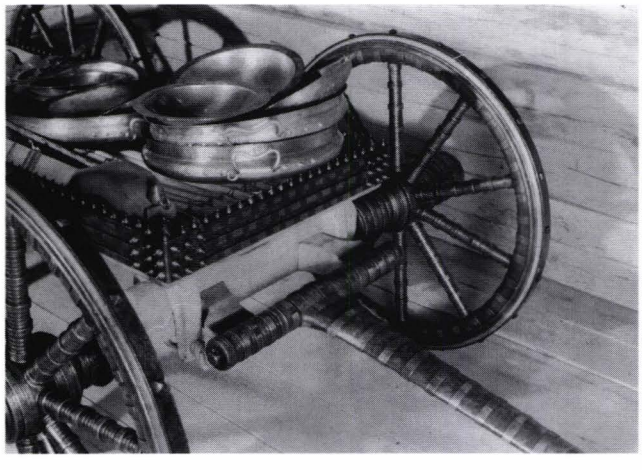
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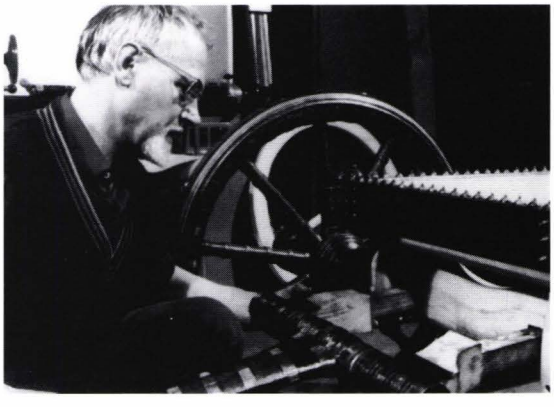
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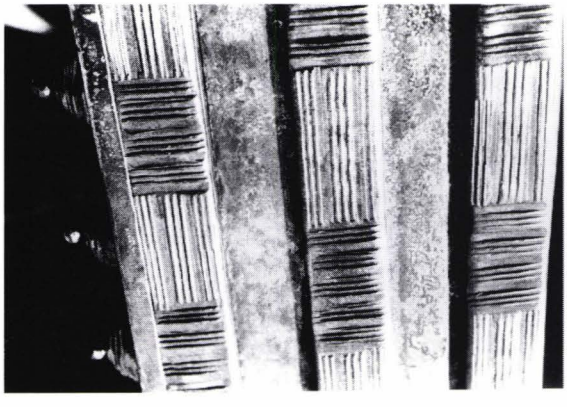
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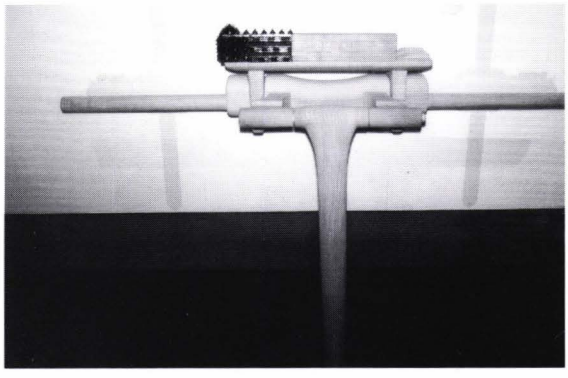

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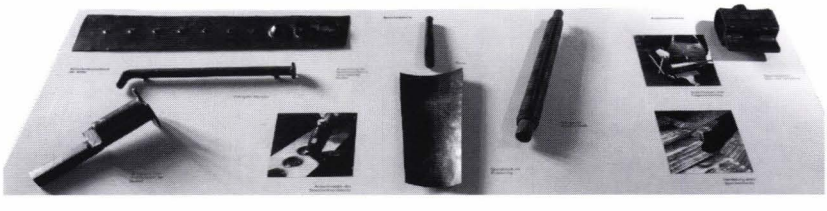

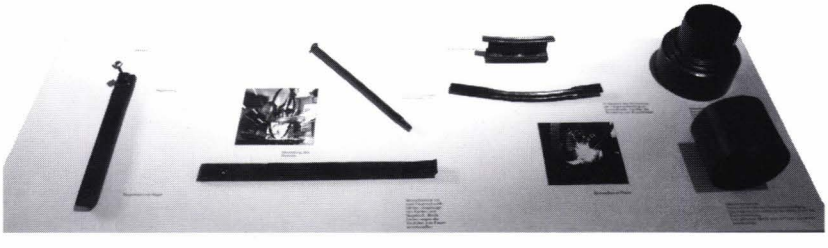

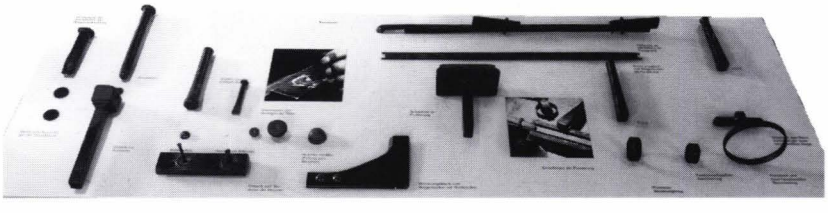

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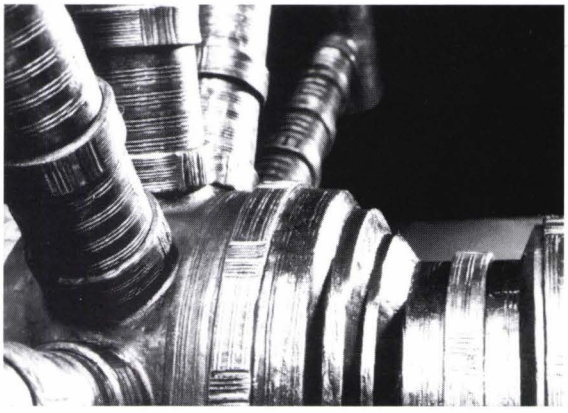
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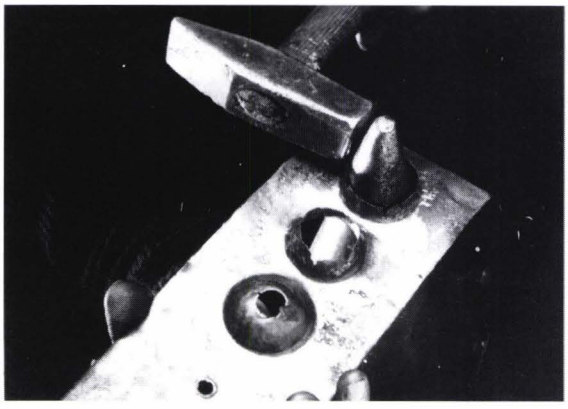
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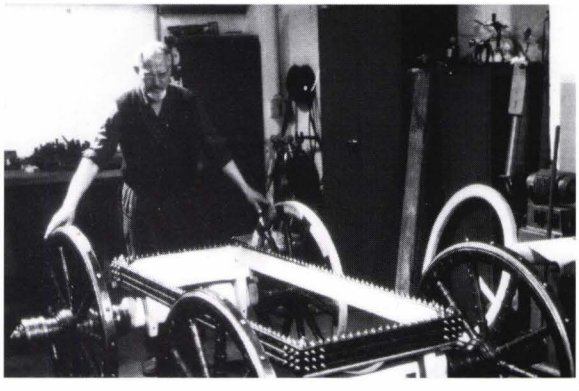
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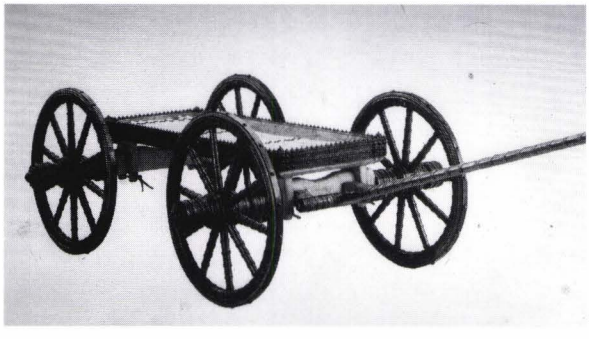
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Tafel 7. 1–2. Bronzeblech dominierte bei der Verkleidung des Wagens;
3. Der Wagen ist fast fertig; 4. Der nachgebaute Prunkwagen
des Fürstengrabes von Hochdorf; 5. Der nachgebaute Wagen im Grab.

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Nowa Cerekwia. A Celtic Centre for Craft and Commerce of Interregional Importance North of the Carpathians

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Keywords: La Tène period, Celts, Upper Silesia, Moravian Gate, central place, trade and production, coinage, Boii

The settlement at Nowa Cerekwia is one of the earliest Celtic sites investigated in Poland in what until recently seemed to be a fairly complete manner. The first reference to discoveries made here goes back to 1870 when a part of the site, then lying within the locality of Bieskau, was made over to a quarry. In advance of its loss to basalt extraction the site was investigated by German archaeologists in the period 1925–1938 (Richthofen 1926, 190–191; Richthofen 1927; Jahn 1931, 66–78, 148–149; Petersen 1935, 140). In the post-war period (1957–1962, 1971 and 1973) Polish archaeologists investigated the remaining part of the site (Czerska1959; 1960; 1976).

Although only a small fraction of the excavated material was ever published, the function and dating of the Celtic settlement at Nowa Cerekwia have been addressed in the archaeological literature on numerous occasions. According to the generally accepted view its role was understood to be that of an outstanding rural settlement combining production and agricultural activities (Woźniak 1970, 90, 206–207; Czerska 1976, 102). This interpretation was founded on the relatively rich inventory of finds which included a large series of wheel-thrown vessels, a few dozen personal ornaments of glass and sapropelite and four coins. One of these was a stater, a chance find made in 1931 (Jahn 1933), the other three coins having been discovered during archaeological fieldwork carried out after WWII, consisting of a 1/8 stater, an Athena Alkidemos type and two obols, both Roseldorf II type (cf. Czerska 1963, 299, fig. 4g; Czerska 1964, 124, 127, fig. 7).

Until recently it seemed that all what could be achieved when it comes to understanding the site at Nowa Cerekwia had already been achieved by the researchers who had already investigated the site. But this was until 2006 when the present writer came across information about discoveries made within the settlement by treasure hunters armed with metal detectors. Thanks to the kindness and goodwill of the metal detectorists it was possible to confirm that amongst the objects they had recovered there were thirty or so early coins of the Boii and a few other exciting finds – for instance, bronze figurines of birds. Although there was no reason to challenge the reliability of the informants, given the modest number of objects attributable to Celts known from present-day Poland, their reports sounded quite exciting. Some of the recovered objects, such as the zoomorphic figurines, had no analogies among finds made so far to the north of the Carpathians and the Sudetesland. To confirm whether the settlement at Nowa Cerekwia indeed still harbours some secrets, in 2007, assisted by a group of detectorists[1] and with the

1 My warmest thanks go to all the field workers who took part in this project, for their selfless assistance and commitment as a result of which it was possible to make the sensational discoveries at Nowa Cerekwia. Special thanks go to Piotr Adamkiewicz, Mirek Bieniecki, Bohdan Kreczko, Sławek Kreczko, Sławomir Miłek, Janusz Modzelewski, Piotr Ducki, Mirosław Staroń, Piotr Szyngiera, Artur Troncik ('Saper'), Jacek Wielgus, Romek ('Stein'), Wojtek ('Prezesszczepan') and Kopacz.

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participation of an archaeologist, M. Bednarek, a surface survey was made of the site. The results of this fieldwork, which continued in the following year in the form of regular archaeological excavation,[2] exceeded my boldest expectations: several hundred Celtic artefacts, not the least of which amongst them being 211 gold, silver and bronze coins. At present this assemblage of the newly recovered finds associated with the Celtic settlement at Nowa Cerekwia – both the result of archaeological survey and from amateur prospecting – is significantly in excess of 1000 items. What is unfortunate, however, is that we may never know their exact number because ever since the end of the archaeological fieldwork in 2008 the area of the settlement has been investigated regularly by detectorists and news of their discoveries are very rarely formally recorded.

The new finds from the surface survey carried out at Nowa Cerekwia have yet to be analysed and published in detail – they have been reported on briefly (Bednarek–Rudnicki 2012, 1390) as have been the coin finds (Rudnicki 2012, 44–51). The present study is the first more extensive presentation of the recovered material. As an introductory analysis it does not pretend to exhaust all of the individual finds, of which some are unique and some simply spectacular. To make a multi-faceted analysis of this vast and diverse material would be to undertake a labour-intensive project which, in practice, could delay indefinitely the sharing the results of the new fieldwork at Nowa Cerekwia. And yet the significance of the discoveries in recent years has furnished a basis for an updated interpretation of the nature of the settlement at Nowa Cerekwia and the role it played in the settlement network of Central European Celts. Conclusions to be drawn from the interpretation of this material are essential for understanding the processes of settlement change which swept across Central Europe during the period between the Middle and Late La Tène period.

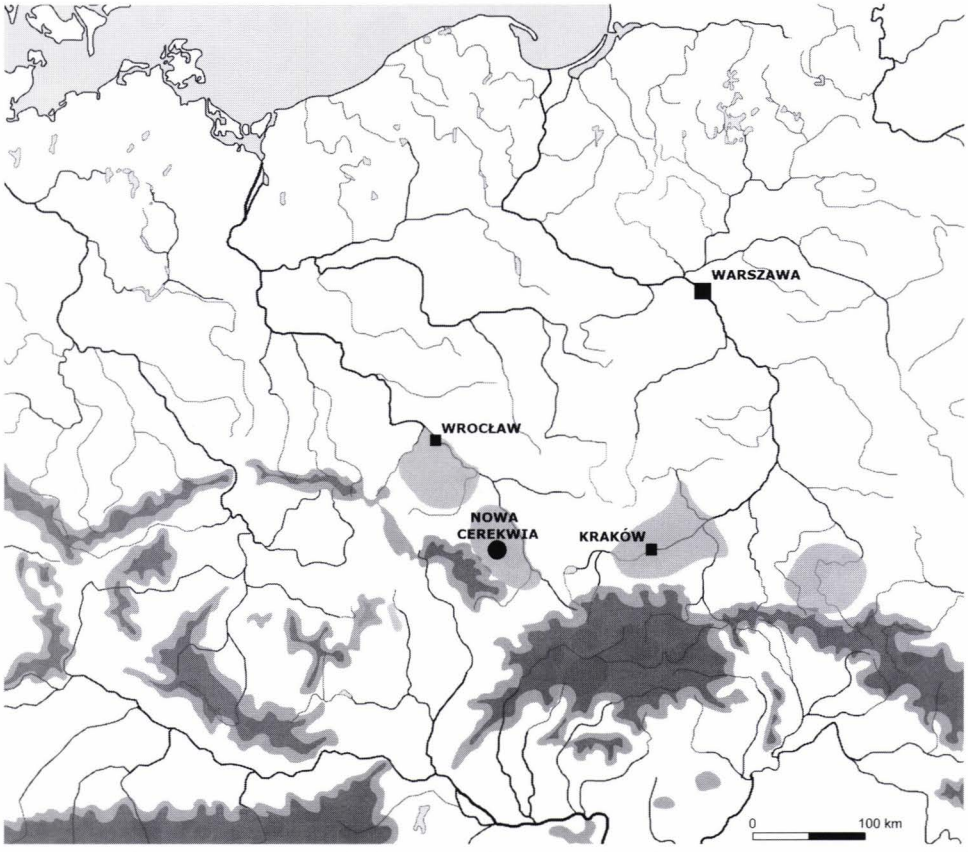

Fig. 1. Locality of Nowa Cerekwia and of Celtic settlement within the present-day territory of Poland.

2 This was a part of a project involving a rescue excavation of the archaeological site at Nowa Cerekwia 4, in the commune Kietrz, (which was under threat) as well as analysis and conservation of archaeological artefacts from this site carried out under the Operational Programme Cultural Heritage, priority: Conservation of Archaeological Heritage, from the resources of Fundusz Promocji Kultury, the Government fund for promoting culture. (Archeologiczne, ratownicze badania wykopaliskowe na zagrożonym rabunkiem i zniszczonym stanowisku archeologicznym w Nowej Cerekwi st. 4, gm. Kietrz oraz opracowanie i konserwacja zabytków archeologicznych).

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Nowa Cerekwia, a small locality in the province of Opole (gm. Kietrz, pow. głubczycki) in Upper Silesia, lies on the border between two major zones in Europe, the Bohemian Massif and Central European Lowlands. A very important aspect of the geophysical setting of Nowa Cerekwia, highly significant for the character of Celtic settlement in this region, is its location in a broad depression between the Sudetesland and the Carpathians – the Moravian Gate (Fig. 1). Dividing these two great mountain ranges the depression of the Moravian Gate throughout antiquity continued to be used as a major communication route linking the south of Europe with the Baltic Sea basin – the Iron Age route described by archaeologists as the Amber Route.

The Głubczyce plateau where Nowa Cerekwia lies is basically a loess upland dissected by deep river valleys and smaller ravines. Owing to its very fertile soils this is an area mainly cleared of forest and under intensive agricultural use. The Głubczyce plateau is sometimes classified as highland on the grounds of its substantial elevation above the sea level (between 200 and ca. 320 m) and its mixed, partly folded relief. One of its characteristic features is small volcanic monad rocks or erosion resistant rocks. One of these leftovers of Tertiary volcanism is found at Nowa Cerekwia and its summit was used for the site of a Celtic settlement (Site 4) – situated about 1500 m to the south-east of the village of Nowa Cerekwia (Pl. 1). In its immediate vicinity there is – at least nowadays – no source of running water. The closest, larger stream is the Troja which flows through Nowa Cerekwia. Up to the present this is the only case of this kind of siting of a Celtic settlement recorded in the territory under Celtic settlement to the north of the Carpathians and the Sudetesland. As a rule, La Tène settlements were sited on relatively low lying ground in the neighbourhood of a stream.

The history of archaeological investigation of Site 4 at Nowa Cerekwia goes back at least to the second half of the nineteenth century. When in 1870, a farmer named Lammich was opening up a quarry in the basalt hillside – at a location known locally as *Altstett* (from German *Alte Stadt* – old town), his workmen came across some spearheads and Celtic objects of green and blue glass (Newrzella 1981, 16). Especially important information about the discovery of weapons, obtained from Lammich's son, was previously unknown to archaeologists. Meanwhile, the new discoveries have created new possibilities for interpreting these finds as will be noticed below. The workmen concluded that the objects they had stumbled across were the property of a young woman taken from her by robbers.

As basalt continued to be extracted over the years (Pl. 2/1) more new objects came to light, for instance, personal ornaments made of glass-beads and bracelet fragments. However, the first small archaeological excavation was made in 1925, by the extreme right wing B. von Richthofen. One of his discoveries was a Celtic pottery kiln. The next excavation in the region of the quarry was carried out, sometime later by O. Hanske and G. Raschke. This was in 1927, and then from 1934 to 1936 and again in 1938. In 1935 M. Stiebler, the head of the commune of nearby Bieskau, an amateur antiquarian and local activist and the source of many valuable details about the finds made at Nowa Cerekwia before World War II, was digging potatoes in the general area of the prior investigations and discovered a Celtic gold coin, subsequently identified as a stater, of the Plumlov type (cf. Kolníková 1998, 22, pl. 1/4; Castelin 1965, 11, no. A-2a, pl. 1/11). Archaeological excavation projects carried out at the time were mostly of a rescue character. Their aim was to explore and record what would be soon lost to the ever-expanding quarry. It is not entirely clear what the German researchers had excavated during their fieldwork as to this day neither the full body of this archaeological record nor the field documentation has been brought together. The surviving archival record assembled by B. Czerska reports the discovery during the interwar years of nineteen features, namely: a pottery kiln (Pl. 2/4), eleven 'houses'[3] (Pl. 2/2–3), six pits and a hearth. However, we still do not know their precise location or their precise lay-out. And this record may be far from complete. According to the account given by M. Stiebler – witness to further discoveries made at Nowa Cerekwia – before WWII a total of 30 pit-houses with post-holes indicated by their black filling had been excavated – not counting those destroyed by the quarry (Newrzella 1981, 17). Most of these pits measured 4 × 4 m, while quite a few were 4 × 8 m (Stiebler 1965, 9). This list of features is rounded off by a vaguely described area "where pottery was fired" (Stiebler 1965, 9). Also unknown is the dating and cultural attribution of the alleged finds of a bank said to have enclosed an area 1 km in diameter with the quarry at its centre. Even before World War II the remains of this site, identified

3 'Pit-house' is a better term.

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by Raschke, were very hard to detect and certainly unrecognizable to the layman (Stiebler 1965, 9; Newrzella 1981). The possible existence of this structure, not confirmed by fieldwork carried out after WWII, was later used to argue, definitely incorrectly, that the settlement played the role of a fortified proto-urban centre or oppidum (Pescheck 1970, 228).

Even less is known about the portable finds discovered during this period, references to which have survived in just a few publications. Next to pottery and bones they include quern stones, beads and fragments of "many pieces" of bracelets of glass, sapropelite, bronze fibulae and the gold coin mentioned earlier.

After the end of WWII field-work on the settlement, now recorded as site no. 4, was resumed. In 1957–1962, 1971 and 1973 it was run by B. Czerska of the Chair of Archaeology of the University of Wrocław. This fieldwork focused on the surviving portion of the settlement to the east and the south-east of the basalt quarry (Pl. 3). At this time a total area of approximately 8300 square metres was investigated, exposing the remains of twelve features interpreted by Czerska as 'houses',[4] eight pits, one hearth and an otherwise unidentified concentration of burnt clay or daub. Apart from a single Neolithic pit-house all the other features and most of the artefacts could be attributed to La Tène settlement. During this fieldwork a vast quantity of artefacts was secured, the majority being potsherds, as many as 87% being from wheel-thrown wares. Amongst other finds there were two silver coins (obols, Roseldorf II type) and one gold coin (1/8 stater, Athena Alkidemos type), a fragment of a bronze belt fastener (?) with a horse-head terminal, fragments of several bronze and iron Middle La Tène fibulae, fragments of bracelets made of sapropelite and of iron and one made of bronze, beads and fragments of glass bracelets, bronze rings (parts of women's chain belts), small amber objects and iron tools (including shears and an axe).

The total number of finds documenting the material status of inhabitants in the settlement accumulated up till the end of investigations in 1973 may be estimated only for coins and glass. If we take into account the registered finds from before WWII, 67 glass objects were recorded, of which 31 were bracelet fragments, and the remainder, mostly beads (Karwowski 1997, 60–61, 65–66), as well as the four coins mentioned earlier – two gold and two silver.

All the later finds, made both by detectorists before 2007 and later by archaeologists, come from the upper levels of the modern topsoil. This is a deposit formed of soil from spoil heaps thrown up during the archaeological excavations of 1957–1962, 1971 and 1973 and used at the end of the dig to fill in the trenches and level the ground in the area of the site. It may be safe to state that only a small fraction of objects discovered recently escaped detection during exploration of structures during the seasons when Czerska was directing the excavations. A vast majority would be objects which had lain within the upper level of the topsoil which was removed by machinery without any further examination during the excavation – something that unfortunately to this day is often the practice during archaeological research in Poland. And yet this is the layer that contains objects either accidentally dropped or discarded in the past on what was then the ground level. This can be confirmed by the situation observed at Roseldorf (Bez. Hollabrunn, Niederösterreich) where the vast majority of coins were found in the plough soil and only a small number during the actual excavation. Also, all the coin finds recovered so far at the open site of Němčice, which now go into thousands, come from the upper level of the humus.

The assemblage of new finds from the settlement at Nowa Cerekwia comprise first of all objects made of non-ferrous metals such as copper alloy, silver and gold. The number of iron objects is small which must be the consequence of the method which was adopted when doing the investigation. Given the extreme saturation of the area with modern iron objects, complete with shrapnel from World War II[5] it was necessary to use some form of discrimination. Obviously, objects made from non-ferrous metals, especially silver and gold, are the primary object of detectorists. This makes their recovery a priority issue in a situation where a valuable site cannot be protected effectively using normal methods. At the same time the potential value of objects made of non-ferrous metals discovered on the site in view of their chronological homogeneity, is hard to exaggerate. If we omit modern objects from the area of interest we are left with only a handful of artefacts not linked to the functioning of the La Tène

4 Assigning to this group also the remains of a rectangular ditch around an inhumation burial (cf. Bednarek 1994).

5 A German artillery unit had been stationed on the site of the settlement.

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settlement. Until 2008 these included two Bronze Age dress pins and the bow of an Almgren 84 fibula from the close of the early Roman period. A positive aspect of this situation is that it helps in identifying the culture attribution of uncharacteristic objects. Almost all finds of this type recognizable by their method of manufacture or patina as dating to antiquity may be safely dated to the La Tène period.

The overview of the new finds given below is into two parts. The first part covers typical 'archaeological' objects, such as personal ornaments, dress accessories and so forth while the second part covers numismatic finds, coins and features associated with minting activity.

Dress accessories

Other than coins one of the largest categories of objects amongst the new finds from the area of the settlement at Nowa Cerekwia, are fragments of dress accessories. Their preservation in some cases prevents their closer typological attribution, at least at this early stage of analysis.

Fibulae, which play the role of the best dating markers on La Tène sites in the group of finds from Nowa Cerekwia, are represented by a few dozen specimens which fall broadly into two chronological groups. At this point we have to bear in mind that a marked disproportion in their number are the result of the method of identification applied of necessity which, in practice prevented the recovery of smaller iron objects. Meanwhile, in the material from fieldwork at Czerska typologically the earliest fibulae were made of iron. This situation is confirmed in finds from Celtic burials discovered at Kietrz only 6 km from Nowa Cerekwia. Most of the graves discovered there are attributable to LT B, the youngest of them to the early stage of Middle La Tène. Out of 46 La Tène fibulae excavated in the cemetery at Kietrz no less than 39 were made of iron (Gedl 1978, 17).

The older group (LT B–C1) includes fragments of a fibula with a spherical knob on the foot or plain (Pl. 4/1) or with a plastic ornament (Pl. 4/2), or most frequently flattened (Pl. 4/3–4). Spherical knobs with a plastic ornament are a typical feature of fibulae from phase LT B2, characteristic mainly for the Carpathian Basin area. Following the classification which J. Bujna has developed using the findings from analysis of grave assemblages without weapons known from Slovakia, bronze fibulae with a large spherical knob, usually flattened and with a plastic ornament, are assigned to type BF-C3-A (Bujna 2003, 51, fig. 12). This type of late variants of fibulae of early La Tène design are recognized by Bujna as diagnostic for the period of transition between phases LT B2 and C1. Spherical knobs with a plastic decoration analogous to those seen on the finds from Nowa Cerekwia have been recorded in Moravia as for example in the cemetery at Holubice-*Dílce*, okr. Vyškovin grave no. 21 dated to phase LT B2 (Čižmářová J. 2009, 53, pl. 10/3–5) and in the settlement at Němčice, okr. Prostějov, where they form the oldest horizon of brooch finds (Čižmář–Kolníková 2006, 262, fig. 1/2, 4–5). The similarity of finds from Nowa Cerekwia and Němčice in this case is not accidental for, as will soon become apparent; there are many more analogies in the repertory of finds from these two sites. At Kietrz, grave no. 2300 contained a fibula with a spherical knob on the foot and a plastic ornament. Partly made of iron, this specimen has a heavy bronze bow and the knob covered with a plastic ornament (Gedl 1978, 19, pl. 11/3). This type of fibula is one of the markers of Horizont 4 of flat graves (Gebhard 1989, fig. 33/2; 35/5) which corresponds to the older part of phase LT B2. Presumably we can assign to the younger stage of phase LT B the plain spherical knob set on an iron foot (Pl. 4/1) – similarly to the specimen from Kietrz. Also attributable to the older group of fibulae from Nowa Cerekwia is a small specimen which survives only as a fragment of a markedly arched bow (Pl. 4/5). A closer determination of this find from the surviving fragments may be impracticable.

The most recent group of fibulae recovered at Nowa Cerekwia is formed by a large number of Mötschwil type specimens (Pl. 4/6–11). They account for over a half of all fibulae recovered at Nowa Cerekwia, which situation closely resembles the one observed in the material record from Němčice (Čižmář–Kolníková 2006, 262). Some of the Mötschwil fibulae have a plain bow, others, a profiled one. Attention is drawn in this inventory to a handful of smaller specimens (Pl. 4/11), which might be considered identical with the early variant of this fibula type known from the cemetery at Mokronog (cf. Guštin 1977, pl. 12), and also from Němčice (Čižmář–Kolníková 2006, 262). However, in our case their poor state of preservation prevents us from making any conclusion of this sort. Mötschwil type fibulae are regarded as the principal marker of phase LT C2 (Hodson 1968, 38; Polenz 1971, 43–44; Polenz 1982, 109; Stöckli 1974, 369, fig. 1; Krämer 1985, 29). In the typology of Gebhard (1991, 7–8,

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fig. 1/1) they are designated as Group 1. Some of the type Mötschwil specimens have an ornamented (Stähli 1977, pl. 3) or a fairly slender bow (Krämer 1985, pl. 23/2). Their largest number is known from Switzerland where the eponymous site for this type is located (Stähli 1977, 83–87, fig. 19). Mötschwil type fibulae are observed in many regions of La Tène settlement: Rhineland, Bavaria, Württemberg, Austria, Bohemia, Moravia, the Carpathian Basin and in the northern Balkans (Čižmář 1970, 570). A large number of finds of Mötschwil type fibulae is known also from settlement sites in Slovakia (Pieta 2008, fig. 14A). With typologically related specimens (e.g. from Podwiesk: Bokiniec 2005, pl. 86; 251/3) they are recorded in a relatively large number to the north of the Carpathians and the Sudetesland and also in areas not under Celtic occupation (pl. 11/2). Mötschwil type is known from only a few finds from an oppidum context (Meduna 1970, 57–58; Jansová 1986, pl. 35/25) where they are thought to define the oldest horizon of these centres in Central Europe. However, there is no denying that the greatest concentration of finds of Mötschwil type brooches in this region is observed at Němčice and at Nowa Cerekwia.

In the inventory of dress accessories even more numerous than fibulae are fragments of women's chain belts made of bronze which are attributable to several types. One of the better represented are links which have the form of a globular knob, often flattened to a varying degree, set between two rectangular or trapezoidal plates. On the outer edges of the plates are two or three holes for attaching the linking chain. Belts made of symmetrical links of this design are known only from settlement sites in Central Europe. The first to draw attention to these belts was J. Werner (1979) who brought together the small number of early finds of this type from the Middle Danube region. The next to address the question of finds of women's chain belts in this area was Pieta (2000, 142) who took interest in the type of belt under discussion thanks to finds from the alleged sacred site of Seravy near to the hill-fort of Čertova Skala, close to Trenčianske Teplice in western Slovakia. He proposed to date this form to the Late La Tène period. This chronology was elaborated by Čižmář using his findings from the analysis of the material from Němčice (Čižmář–Kolníková 2006, 264, fig. 5/1–3). Taking into account the chronology of materials from this centre in Moravia and the scarcity of these belts in grave assemblages, Čižmář concluded that chronologically they belong in phase LT C2. The concentration of finds of this type of dress accessory in Moravia was used to argue that this is where they were manufactured, in particular in the settlement at Němčice where their half-products had been recovered (Čižmář–Kolníková 2006, fig. 6/3, 5, 7). The question of these belts was addressed more recently by Bujna (2011, 123–124, fig. 52) who assigned them to group Gk-R of his typological system. At the same time he observed that their scarcity in grave inventories in flat cemeteries and the lack of finds from chronological contexts makes it possible to date these elements of clothing only very broadly within phases LT C2–D1. Analysis of the chronological context of all the finds from Nowa Cerekwia leads us to state that definitely Čižmář was right to argue that the production of these elements of female dress coincides with phase LT C2. However at the current stage of research we cannot rule out that it is not impossible to postulate the continuity of this form during the Late La Tène period. Nevertheless some doubt in this respect is raised by the shortage of finds of these artefacts which have been recovered from oppida contexts.

We have to note also that the belt links recovered at Nowa Cerekwia – at least the better preserved ones – differ quite significantly from variants known so far and have no analogies in the material record currently available. This applies to a specimen (Pl. 4/12) which is not symmetrical and has a central section in two parts: one of them egg-shaped, the other of hourglass shape. We may surmise that this was also the design of a heavy link (Pl. 4/13) ending in trapezoidal plates decorated with a motif of concentric rings and an S-shaped ornament filled with enamel. It is also notable that these two unusual links have traces of having been exposed to high temperature.

A few other finds may possibly be elements of this type of belt chain (Pl. 4/14–16). But, equally, they could represent a slightly different type: one with a horizontal ring between two rectangular or trapezoidal plates. A belt of this type, with links fitted with rectangular plates, was part of the inventory of a woman's grave discovered at Křepice (okr. Břeclav) in south Moravia. Other elements of this inventory date the whole assemblage to phase LT C1 (cf. Čižmářová J. 2004, 215). An intact belt, but with roughly trapezoidal plates for link attachment was discovered at Oberrohrbach (Lower Austria). Presumably it belonged to the inventory of a female cremation burial which is dated by fibulae (group EF-K of Bujna) to the younger horizon of phase LT C1 (cf. Lauermann 1989; Bujna 2011, 121). Finds of links with

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rectangular plates were recorded in the assemblage of finds from the settlement at Němčice repeatedly invoked here, which site also yielded evidence on their manufacture (Čižmář–Kolníková 2006, 264, fig. 5/5–6). Bujna (2011, 121–122, fig. 51) assigned these belts to his group Gk-P, which he proposes to date to phase LT C1 based on the grave finds from Moravia and Lower Austria mentioned earlier.

Elements of bronze belts of interest are represented in the finds inventory from Nowa Cerekwia by fragments of links. One of these (Pl. 4/17) comes from a belt, type Gk-P-2b of Bujna, similarly as the find from Landkreis Laufen (?) published by Krämer (1985, Taf. 53 E/12). The distinctive elements in these links are the trapezoidal plates, which are divided from the central ring not by a constriction but by a thickened rib. The next fragment (Pl. 4/18) is most likely to belong to Bujna's type Gk-P-3a, similar to one of the fragments discovered at Němčice (Čižmář–Kolníková 2006, fig. 5/6). Another find that can be classified in this typological group is a fragment of a link with plates decorated with enamel and one hole still in place (Pl. 4/19). Although its state of preservation prevents its closer attribution, this find may represent a belt chain variant not recorded in the past. Definitely unique is an openwork link which, instead of two plates on two sides of the ring, has outlines of stylized birds, their beaks touching (Pl. 4/20).

In the group of finds of belt chain fragments from Nowa Cerekwia there are links from a belt (Pl. 4/21–22) of a type described in the literature as 'Middle German' (*mitteldeutscher Typus*), which term was introduced by Th. Voigt (1958, 435, 462). His work was cited by Reitinger (1966, 213–214, fig. 9/2, 3; 10/21), who proposed to describe as *mitteldeutscher* belts made of stubby links divided into two by a bar-like rib and ending on both sides in knobs, analogical to our find from Nowa Cerekwia. This type of belt is characteristic mainly for the Mittelgebirge region of Germany and is more rarely encountered in the Middle Rhine, in Austria, in Bohemia, and across the Carpathian Basin (Bieger 2003, list 16, map 18). Links from this type of belt chain are quite numerous to the north of the Carpathians. One of them was the only element of grave furnishings in a cemetery of the Przeworsk culture at Warsaw-Wilanów (Marciniak 1957, pl. 78/16), from a Celtic settlement at Pełczyska (pow. pińczowski) in the western part of Lesser Poland and in settlements of the Przeworsk culture at Kamień (pow. kaliski) and Gąski (pow. inowrocławski) in Central Poland. This fairly rich record is due to the fact that the settlement at Nowa Cerekwia was a centre of production of chain belts of this very type. This is suggested by an unfinished link (Pl. 5/1) discovered during Czerska's investigation. In these circumstances the name 'Middle German', suggesting as it does a geographical connection of these chain belts with Central Germany, seems misleading. But questions of terminology aside we may conclude that the period of popularity of belts of interest to us here coincides with phase LT C1. This dating is the result of the conclusions of Bujna who defined belts composed of links analogical to the find from Nowa Cerekwia as variant J-AXa in his group Gk-J (Bujna 2011, 100–105).

Among the finds of bronze belt chains recovered from Nowa Cerekwia there is a fragment of a cross-shaped link decorated with enamel (Pl. 5/2). Its preservation is too poor to determine conclusively the typological position of the original belt. This is because cross-shaped links appear in two types of belt chain, one of which is the Austrian-Bohemian type (Reitinger 1966, 213 fig. 9/15–19). At the same time possible chronological differences between the types are not too great as both date to LT C1 (Bujna 2011, 100–101, 106–107, 137–140, groups Gk-J and Gk-K).

Similar doubts apply to a bronze element decorated with enamel with a stylized animal-head terminal (Pl. 5/3). This form of terminal is without any exact analogies in the La Tène world. Worse still, it is not fully clear where exactly in the belt this element used to fit. Given its hook-like terminal in the form of a stylized animal-head it could be the fastener. If we accept this interpretation we have to question the method of attachment of this element to the rest of the belt. Chain belt terminals, depending on whether they were main or side fasteners, were attached to the rest of the belt with a horizontal sleeve on the opposite side to the hook, or with vertical sleeves (in case of the side terminals), in which were fixed ornamental links or bronze rings. This first solution would apply to the element – presumably a belt tag – from Němčice (Čižmář–Kolníková 2006, 264, fig. 5/9). If we set aside the difference of design this artefact is stylistically a very close parallel to the find from Nowa Cerekwia.

While the belt tag from Němčice has a horizontal loop attached to it our specimen has a narrow frame around which survives a ring of bronze sheet. A similar feature is seen on an ornamental attachment from a belt of Austrian-Bohemian type part of the inventory of inhumation grave no. 67 from late

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LT C1 discovered in the cemetery at Palárikovo (okr. Nové Zámky) in south-western Slovakia (Benadik 1975, 98; Zachar 1987, 166, fig. 159–161; Bujna 2011, 106, fig. 44/1a–c). In its design and ornamentation this piece closely resembles the find from Nowa Cerekwia. Basically the difference is that the belt attachment from Palárikovo has no hook-like terminal. Instead, to the V-shaped terminal of its frame-like construction are attached two decorative pendants. What is also striking is the similarity of the stylised animal head represented by the find from Nowa Cerekwia and on the main terminal of the belt chain from Palárikovo.

It is possible that the find from the settlement at Nowa Cerekwia is an ornamental belt attachment rather than a belt terminal. A belt attachment of a similar form but not decorated with enamel and with a ring in place of the animal head, was discovered at Stradonice u Libochovic (Kruta–Lička 2004, pl. 11/16). Taking into account such features such as form, proportions and ornamentation technique, it seems quite likely that the belt attachments from Němčice, Nowa Cerekwia and Palárikovo were made in the same workshop or by the same craftsman. In case of finds from the two latter sites this is supported also by the analogical form of the stylised animal heads serving the role of hooks (see earlier discussion).

Presumably we can add to this group of finds of women's chain belts elements a few more objects (Pl. 5/4–7) which have no analogies in the material record amassed so far namely, bronze objects in the form of two sleeves separated by a variously accentuated constriction. In one of them the outer parts of the sleeves are lightly profiled and decorated with a motif of a diagonal cross (Pl. 5/4). This specimen resembles somewhat belt links from the oppidum Stradonice (Píč 1903, pl. XV/1; XXI/24). In the other specimens the outer surface is plain. There is no doubt however that these are not fragments of larger objects, or unfinished products of, for example, bronze beads. Despite the lack of analogies, the size and traces of wear indicate that these are most likely to have been belt chain links. If this tentative interpretation is confirmed then it may be justified to describe these forms as the 'Silesian' type. Similar links are known from locations other than Nowa Cerekwia. One, as yet unpublished, specimen, comes from the writer's own field work at the Celtic settlement at Pełczyska (pow. pińczowski) in western Lesser Poland. The simple form of these specimens which is close to the style of the finds from Stradonice, and also the shortage of similar finds from grave contexts, are a strong argument in favour of dating these objects to not earlier than phase LT C2 and LT D1.

In the collection of new finds from Nowa Cerekwia there are quite a large number of bronze rings of various diameters and cross-sections (Pl. 5/8–22). Most of them presumably are elements connecting the links of the belt chain, a typical feature of most women's bronze chain belts of Austrian-Bohemian, Middle German, Swiss and Hungarian type (cf. Reitinger 1966, 205). In the main, the only exceptions are belts in which the links are connected with a chain (cf. Bujna 2011, 121–124). The function of the finds from Nowa Cerekwia is confirmed in a few cases by evidence of use-wear observed on the metal where it would have rubbed against the belt link (Pl. 5/9, 21). Continued friction could have caused the ring to fracture (Pl. 5/18–19).

Equally numerous as the rings in this group of finds are bronze pendants (Pl. 5/23–34) which served as terminals of a belt chain. This is similar to those recorded in, once again, the settlement at Němčice (Čižmář–Kolníková 2006, 264, fig. 5/13–20) where the range of finds is very similar. There is similarity also in the design of these pendants of which many, at both sites, are bipartite forms, pear-shaped with a thickened terminal (Pl. 5/23–24). Also notable is the presence of similar single pendants (Pl. 5/25), some with an unthicken terminal (Pl. 5/26), and some spindle-shaped forms too (Pl. 5/27–29). A separate group have oblong and flattened pendants (Pl. 5/31–34), some of them with punched ornament (Pl. 5/32–33) or decorated with enamel (Pl. 5/31, 34). The pendants recovered at Nowa Cerekwia have numerous analogies not only among the finds from Němčice but also from many other La Tène sites (Bujna 2011, 65; Čižmářová J. 2005, fig. 75/6; Filip 1956, Tab. XLIII/4–5; Krämer 1985, Taf. 13/1; 79/5). Spindle-shaped pendants formed part of a complete belt of Austrian-Bohemian type, an element of the inventory of grave no. 13 in the cemetery at Giengen an der Brenz in Württemberg (Polenz 1982, 67, 68, Abb. 8/2). Polenz proposes to date this assemblage to the early stage of LT C1 (Polenz 1982, 116) although fibulae found in the Giengen cemetery (Polenz 1982, 66, Abb. 7/1–8) resemble in their design forms characteristic for the close of that phase (cf. Bujna 2003, 58, fig. 25). A pendant for the specimen decorated with red enamel (Pl. 5/31) is known from Brno-Lišeň–*Staré Zámky* (Čižmářová H. 2012, 187, pl. I/2). It should be noted that finds of this type of object have been recorded also to north of the

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Carpathians in western Lesser Poland, one of them at Wyciąże (Poleska 2006, fig. 21/22), the other in the settlement site at Zagórzyce (an unpublished find, pers. com. M. Grygiel). Also noteworthy is a pendant (Pl. 5/30) with a plastic triangular knob with a central dent and a diagonal cross, possibly intended for enamel inlay. It has a very close analogy in the belt from Palárikovo in Slovakia (cf. Benadik 1975, 98; Zachar 1987, 166, fig. 159–161; Bujna 2011, 106, fig. 44/1a–c).

The list of belt chain fragments recovered at Nowa Cerekwia is completed by a series of fasteners or buckles (Pl. 6/1–3). Poor conservation hinders their typological classification. Found among them are specimens with a hook terminal in the form of a stylised animal head with bulging eyes (Pl. 6/1). Hooks of similar form are a feature often observed on fasteners or buckles of Celtic chain-belts. A highly similar terminal is seen on the side fastener of the belt from Palárikovo just noted and on a Hungarian-type belt chain from Raggendorf (Lauermann 2009, fig. 1–5). In this group of finds there are also simple forms of buckles or fasteners with a leaf-shaped plate and a hook-like terminal (Pl. 6/2–3). Even in their fragmented condition it can be ascertained that in one case flush with the plate there was a ring. Simple belt fasteners or buckles of this form are much rarer than specimens with stylised animal representations. A specimen of a similar design was recorded at Lenešice (okr. Louny) in north-western Bohemia (Filip 1956, pl. XLIII/6).

Women's chain-belts appear in graves of Horizont 5 of flat graves (Gebhard 1989, fig. 45). The period of their greatest popularity is in LT C1 but finds from oppida contexts and also some late grave inventories (e.g. from Bavaria, Krämer 1985, pl. 1/7; 8/1, 4; 23/1) confirm their widespread use during LT C2, possibly even in LT D. The belt chain fragments from Nowa Cerekwia may be dated to LT C1 and LT C2; this is indicated by most analogies invoked here. A closer dating of individual elements of women's chain-belts is a challenge. In many cases some of the characteristic elements (buckles or fasteners, links, pendants) were all fixed to one and the same belt which could be one of a number of types. It is worth noting that these dress accessories were often quite elaborate, presumably assembled from elements selected from what individual craftsmen had in stock. A conclusive identification of separate belt types is possible only in some cases. In this situation the classification and dating of these finds from settlement contexts, surviving fragmented as a rule has to be matched against a serious degree of error.

Personal ornaments

The dominant find in the group of personal ornaments made of bronze recovered from the settlement at Nowa Cerekwia are fragments of bracelets and anklets (Pl. 6/4–11). Possibly the oldest among them is an unfinished segment of a bracelet in the form of a plain, round-sectioned ingot with thickened and profiled terminals (Pl. 6/4). This is a form highly characteristic for LT B1. In the classification of Bujna (2005, 12–15) it corresponds to types BR-A1-Ba (bracelets) and types BR-A2 (anklets). Their dating, confined to the older phase of LT B, is confirmed also by finds from cemeteries in Moravia, e.g., from grave no. 45 in the cemetery of Holubice–*Dílce* (Čižmářová J. 2009, 53, pl. 18/17) and Heršpice 3–*Na újezdech* (Čižmářová J. 2013, 33, 190, pl. 16/13). The survival of this form into LT B2 is confirmed by its presence in the inventory of burial no. 11 in the cemetery at Manching–*Hundsrucken* (Krämer 1985, 23, pl. 31/9).

An equally early dating may be that for a bracelet also made from an ingot, decorated with closely spaced transverse incisions, with thickened terminals (Pl 6/5). This is because their closest counterparts in the typology of Bujna (2005, 18–19) are forms classified as types BR-B1-Aa, dated by the present writer to LT B1b. Even so, in south Bavaria similar forms are one of the markers for Horizont 4 of flat cemeteries (Gebhard 1989, fig. 39/19), which corresponds to the older phase of LT B2. Ingot bracelets, possibly anklets, decorated with closely spaced incisions are one of the markers of the same horizon also in Moravia and in Bohemia (Gebhard 1989, fig. 33/13; 35/15).

The largest group of bracelets are made of more slender ingots. The form with profiled terminals (Pl. 6/7) has parallels in Early La Tène grave inventories recorded in Moravia (Čižmářová J. 2009, pl. 21/17). On the other hand, specimens decorated around their circumference with engraved ornament (Pl. 6/6, 8) have very good analogies in the material from Němčice (Čižmář–Kolníková 2006, 262, fig. 2/5, 7–9). This Moravian centre has also yielded fragments of ornaments decorated with pseudo-filigree (Čižmář–Kolníková 2006, fig. 2/10, 12) on which is seen a ring-and-dot design – the same as on one of the finds from Nowa Cerekwia (Pl. 6/9). Even so, the best stylistic analogy for our find appears

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to be the neck ring from grave no. 70 in the cemetery at Holubice (Čižmářová J. 2012, 204, pl. VIII/6). Presumably, the personal ornament from Nowa Cerekwia also had four ornamented thickened bulges spaced on its perimeter at even intervals. It probably dates to LT B2, as is also the case of the neck ring from Holubice and other ornaments with a similar, 'quadripartite' design from Moravia (Čižmářová J. 2012).

There are also good analogies to be found in the material from Moravia for another bracelet, decorated around its circumference with bronze knobs in groups of three (Pl. 6/10). Even if we have only a small fragment of this specimen we may conclude that it resembled bracelets found in graves no. 64 and 67 in the cemetery at Holubice–*Dílce* (Čižmářová J. 2009, 53, pl. 25/13; 26/8, 11). The former contained a Münsingen fibula and represents the older phase of this cemetery (LT B1); the second grave assemblage is younger (LT B2).

The other find – a bracelet, possibly an anklet (Pl. 6/11) – is quite unique and has no analogy in the category of bronze personal ornaments. Originally it consisted of three segments attached with hinges. Given its characteristic cross-section its prototypes may be found among glass bracelets with three ribs. In this case we can suggest Haevernick's types 5b, 6a, 6b and 6d which differ in the colour of their glass and style of ornament but not in their cross-section. Consequently we cannot say which of these types provided the direct inspiration for the ornament and this affects the question of its dating. Bracelets of type 5b are rare, their chronology coincides with LT C1 (Venclová 1990, p. 118). A similar dating is feasible for bracelets type 6b/1 while the slightly younger type 6b/2 – belongs in stage LT C1b (Karwowski 2004, 65, fig. 17). The chronology of type 6d is similar, correlation being based on analysis of finds from present-day Austria dating to LT C1b-C2 (Karwowski 2004, 77, fig. 25). Of the class of ornaments of the greatest interest to us here the most widespread in the western region of Central Europe is type 6a. It appears during LT C1, but it is seen also in LT C2, and even during the Late La Tène period (Venclová 1990, 119–120). Thus it follows from the evidence cited above dating the find from Nowa Cerekwia more closely than between LT C1 and C2 may not be feasible.

Amongst the finds inventory under analysis here is a fragment of a *Hohlbuckelringe* or anklet composed of hollow hemispheres (Pl. 6/12). Ornaments of this type are a characteristic element of the grave goods in burials of Celtic women, especially in the central and eastern zone of La Tène culture. As they tended to evolve relatively steadily across time they are a fairly reliable chronologically diagnostic form. According to Gebhard (1989, fig. 45) specimens which consist of more than ten hemispheres are observed in Horizont 4 of flat graves, while those of less than ten hemispheres are attributable to Horizont 5, and those with less than five hemispheres appear in association with forms from Horizont 6. The period of greatest popularity of anklets with hollow hemispheres is during LT B2 (Krämer 1962, 35; Gebhard 1989, 120). The specimen from Nowa Cerekwia survives in a much fragmented state but the reconstructed form and the dimensions of its surviving hemispheres indicate that there may have been more than five of them.

It is hard to conclude as to what fragment of what personal ornament or what dress accessory is the next item in the inventory of finds from Nowa Cerekwia – a cluster of three knobs decorated with punch-marks (Pl. 6/13). This object brings to mind the finds from the settlement at Němčice some of which are interpreted by J. Čižmářová (2012, 208, pl. X/19–21) as belt-chain links, others as spacers of bead necklaces. However we cannot discount that in our case this may be a decorative element of a bracelet ornamented with pseudo-filigree.

A find without analogies whatsoever is a fragment of a hoop of bronze sheet with raised edges between which there are hemispherical knobs (Pl. 6/14). In view of its small reconstructed diameter this object may be interpreted as a fragment of a finger-ring.

A possible personal ornament could be the bronze figurine of a stylised human, arms crossed over the breast (Pl. 6/15). It survives nearly complete missing only a fractured eyelet. One of the eye sockets retains a residue of black enamel which may have also decorated the round impressions above the arms. Although this artefact lacks exact analogies similar, small anthropomorphic figurines are recorded pretty much everywhere on the Celtic territory (cf. Čižmář 2012, 147, fig. 1–4). Five finds of this description were found in the inventory of Němčice. One of them (Pl. 6/16), despite some differences, resembles the artefact from Nowa Cerekwia. Small figurines of humans are relatively numerous in the Italic and Etruscan environment as early during Hallstatt and Early La Tène periods (Lippert 1994). But,

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according to Čižmář (2012, 147), the figurines from Němčice and other sites in Moravia differ substantially stylistically from the Italian examples and their origin is best traced to the Celtic territory north of the Alps. The presence of the eyelet on top of its head makes this figurine different from the Němčice find, and many others similar to it. It may have been worn as a pendant around the neck or attached as a pendant to the terminal of an elite belt-chain.

Related by its anthropomorphic form to the find just described is a figurine in the form of a human foot (Pl. 6/17). This object, decorated in its upper part with engraved lines, has survived intact. Highly stylised, it cannot be easily identified to be the representation of a naked foot or of a shod one – although the first interpretation seems more plausible. Not less than nineteen finds of this type have been recorded in Moravia so far, five of them at Němčice (Čižmář 2008; 2012, 149–150, fig. 7–8). The only way in which the specimen from Nowa Cerekwia is different from them is that it has no eyelet or a hole for suspension. Perhaps this is an unfinished object. The foot figurine from Nowa Cerekwia may be classified in the same typological group ('B') as its counterparts from Moravia (cf. Echt 1999, 96–103; Warneke 1999, 135–139; Čižmář 2012, 150). The younger finds – dating to the Middle and Late La Tène – are recorded not only in Moravia, but also in the oppidum of Stradonice (Pič 1903, pl. XXV/7, 11), the cemetery at Wederath (Haffner 1989, fig. 35, 45), as well as in France (Feugère 1998; Giganon 1999).

A special place among the finds from Nowa Cerekwia is occupied by objects which, while they date from the time when the La Tène settlement was in use, are nevertheless an element foreign to that culture. This is true of the fragments of collars known as *Kronenhalsringe* – a personal ornament characteristic mainly for the Danish and the northern German zone of the Jastorf culture. At least five of these collars were recovered at Nowa Cerekwia, some of them unfinished – which, given the La Tène context of this settlement, might seem unexpected. But if we take a closer look at the material from Nowa Cerekwia in a broader cultural context, from the perspective of the situation in the territory to the north of the Carpathians and Sudetesland, this state of affairs is validated, explaining many cultural processes which unfolded in this northern territory. However, these issues are in need of a separate, more extensive discussion.[6] And, while on this subject, it is worth referring to at least one of these objects – highly significant for the interpretation of the circumstances surrounding the decline of the settlement at Nowa Cerekwia. The object concerned is a bronze hinge with a head in the form of a rosette with three horizontal projections and a terminal with an incised ornament at the top (Pl. 6/18). Hinges with a tripartite rosette appear only rarely in the territory of the Jastorf culture. The only, but close, analogy is the fastening of a collar from Söhren in eastern Holstein (Hingst 1964, pl. 18) (Pl. 6/19). A tripartite rosette, although a little different in shape, is seen gracing the top of a hinge discovered at Geesthacht, also in Holstein, but in its southern outlying area (Kersten 1951).[7] Both collars are relatively late forms but their chronology may be conjectured only indirectly – through stylistic parallels to other classes of object. On this basis both finds may be dated broadly to LT C. On La Tène territory, outside Nowa Cerekwia, finds of *Kronenhalsringe* are practically unknown – barring one exception an as yet unpublished[8] hinge with a very similar tripartite rosette discovered at Němčice.

The list of personal ornaments recently secured from the settlement at Nowa Cerekwia is completed by a few dozen glass finds, fragments of bracelets and beads. Most of them are types recorded earlier at this site (cf. Karwowski 1997, 60–61, 65–66). They are mainly fragments of bracelets of dark blue cobalt glass and are specimens of a form assigned to Group 14a/1 (Pl 7/1), Row 1 by Gebhard (1989, 128, fig. 49–50) and ought to be dated to within LT C1. In grave inventories they are discovered in association with the oldest forms of bracelets made of blue-green glass (Karwowski 2004, 33, 69, fig. 17, 25).

Another class also present in the newly recovered material is Group 6b/2 (Pl. 7/2). Bracelets of this form became widespread during LT C1b, possibly after its close (Venclová 1990, 120–122; Gebhard 1989, pl. 7–8; Karwowski 2004, fig. 25) and were continued to be manufactured until the end of the Middle La Tène period and possibly even a little longer (Venclová 1990, 122).

The next class present in the assemblage from Nowa Cerekwia is Group 13a/1 with low central ribbing (Pl. 7/3). According to Venclová (1990, 128) this variant may be younger than Group 13a/2, with

6 They will be addressed in a separate study now being developed together with A. Maciałowicz.

7 I take this opportunity to acknowledge A. Maciałowicz for his help during library research on the *Kronenhalsringe*.

8 My warm thanks go to J. Čižmářová for letting me use information about this find (Moavské Zemské Muzeum inv. no. 167.811).

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higher ribbing, dated to LT C1b. In the view of Venclová the time when the bracelet form of interest to us here was manufactured is presumed to have been during LT C2.

Further specimens of cobalt glass representing the Group 8b variant 1 with a broad central rib and relatively long incisions (Pl. 7/4) and variant 2, with a highly arched central rib and shorter incisions (Pl. 7/5–6) are to be dated to LT C1b (Gebhard 1989, fig. 50; Karwowski 2004, fig. 25).

This provisional review of new finds of glass bracelets from Nowa Cerekwia closes with specimens from Group 7a/1 (Pl. 7/7) and Group 7a/2 (Pl. 7/8–9). The first of these forms, in blue glass, was manufactured during LT C1b and C2 (Karwowski 2004, fig. 25). Specimens of variant 7a/2 made of plain glass with yellow 'foil' – a film of yellow opaque glass on their inner face – are a form characteristic only for phase LT C2 (Gebhard 1989, fig. 52/3; Karwowski 2004, p. 73, fig. 25). This is confirmed by numerous grave finds, mainly from Switzerland (Stähli 1977, pl. 15/1–2, 16, 21; 25/1–12; 27/1–3, 34) and Bavaria (Krämer 1985, pl. 25), where these bracelet types are found in association with Mötschwil type fibulae.

A form of artefact not recorded earlier, not only in the settlement at Nowa Cerekwia but not in any other site to the north of the Carpathians and the Sudetesland, are cylindrical objects of blue coiled glass thread (Pl. 7/10–15). Identical objects have been recorded at Němčice and are generally interpreted as unfinished beads (Čižmář–Kolníková 2006, 264, fig. 3/2–4; Venclová *et al.* 2009, 387, fig. 2). The unfinished beads from Nowa Cerekwia, like most of those discovered at Němčice (55 specimens), would have been used to manufacture ring-shaped beads of cobalt blue glass, Type 155 in the classification of Venclová. Finished objects of this type were recovered during the archaeological investigation of the site at Nowa Cerekwia by Czerska (Pl. 7/16), and more recently as well (Pl. 7/17). They are not a very narrow chronological marker. This is because they continue in evidence for the entire duration of Celtic glassmaking. Large numbers of them were manufactured to the south-east of the Alps at the turn of HaD and LT A. In Central Europe they are well represented in grave inventories dated to LT B1 and C2, and are recorded also in Late La Tène sites (Venclová 1990, 56–57). In this context what is of significance is that they document glassmaking in a settlement found to the north of the Carpathians and the Sudetesland which we can date using the rest of the finds from Nowa Cerekwia.

Other bronzes

Passing to a discussion of the next category of finds under analysis once again we shall use for a reference point mainly the materials from Němčice. This time our focus is a series of small bronze zoomorphic figurines of which not less than a dozen were found at Nowa Cerekwia (Pl. 7/18–27; 8/1–7). Most of them are representations of birds. The largest specimens have a length of around 30 mm (Pl. 7/18), the smallest less than 11 mm (Pl. 7/27). They tend to be simplified forms, with bulging eyes as their only prominent feature while, some of these figurines are decorated with engraved lines (Pl. 7/22) or even enamel (Pl. 7/24). Representations of animals other than birds are much less common. Among them is a figurine of a hare with an iron collar around its neck (Pl. 8/1), an ox or a cow (Pl. 8/3) and a hedgehog or a badger (Pl. 8/2). In this latter case species identification is made difficult by the degree of stylisation of the representation. Nevertheless, this is more likely to be a representation of a hedgehog as supported by the proportions of the head relative to the rest of the body and its short snout. A common feature of the figurines is their flat or rather, recessed base or the presence of feet and a lack of means for attachment, holes or traces of soldering. There is no evidence to treat these objects as appliqués for fixing to other objects. Most likely they served their function in the form in which they have now been recovered. A separate, much smaller, group are appliqués, one face flat, in the form of stylized animal heads or obscure fantastic creatures (Pl. 8/4–5).

Very similar, at times nearly identical, zoomorphic figurines have been recovered from other Celtic sites in Central Europe, most notably, once more at Němčice. The assemblage of finds from this site included 67 artefacts of this sort (Čižmář–Kolníková 2006, 264, fig. 4/4–6, 8–10; Čižmář *et al.* 2008, fig. 6/4–6, 8–10, fig. 7; Čižmář 2012, 150–152, fig. 9–12). No less than 53 of them are representations of birds, mostly water fowl (28 specimens). Amongst the rest is a creature reminiscent of the hedgehog from Nowa Cerekwia, here identified as a badger (Čižmář 2012, fig. 12/1). Čižmář expressed a view, probably incorrect, that originally these figurines had been soldered to a metal base (see earlier discussion).

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A larger series of analogous finds (22 specimens), again most of them birds, comes from a number of unlisted sites to the north and south of the Danube (JANDRASITS 2003). It is quite likely that one of them is the settlement at Roseldorf (Bez. Hollabrunn), the other – a similar site at Etzersdorf in Lower Austria. Jandrasits has argued – to my mind, quite incorrectly – that these figurines are coin weights. This interpretation is contradicted by the fact that these figurines do not seem to correspond to any specific standard.

Individual zoomorphic figurines have also been discovered in other sites in Lower Austria, for example at Michelstetten (LAUERMANN 2010, 211, fig. 24, pl. 77), and also in Moravia (ČIŽMÁŘOVÁ J. 2004, 162, 290; ČIŽMÁŘ 2012, 151, fig. 13, 14). An exception is the site at Polkovice (okr. Přerov), with two, and at Čejč (okr. Hodonín) with three specimens (ČIŽMÁŘ 2012, fig. 13/3, 6, 10, 12–13). Consequently we may argue that the finds of zoomorphic figurines evidently clustered in the area of a specific type of settlement, such as Nowa Cerekwia, Němčice, and also Roseldorf and perhaps Etzersdorf. This could be a clue to their function which most probably was in some way religious. Given their high degree of similarity we may surmise that the figurines played the role of a standardized form of votive object. Perhaps they were offered to a deity whose principal attribute was birds. This possibility is suggested by the iconography of the Gundestrup cauldron on which one of the representations is that of a female deity holding a bird in her right hand and with two birds one either side of her head. It is likely that in centres such as Roseldorf, Němčice and Nowa Cerekwia which we can classify as major centres of worship where this type of votive object would have been offered in sacrifice. If this was so, then could it be that the sanctuary dedicated to a bird deity had a particular structure which so far has eluded detection. It is noteworthy that the investigation of sanctuary structures at Roseldorf unearthed a rich assemblage of votive objects which however did not include figurines similar to those we have discussed here (cf. HOLZER 2009, 53).

The small number of figurines discovered in oppida contexts among which there are specimens provided with a loop for suspension suggests that during phase LT D the popularity of the 'bird' deity had declined or that these objects were serving a different function than during the earlier period.

This section of the finds inventory from Nowa Cerekwia is completed by a group of objects of unknown purpose. Most of them presumably may be interpreted as weights, which in theory at least would relate them to the monetary system of the Boii (cf. PAULSEN 1933; CASTELIN 1965). To begin with very few objects which have suspension loops (Pl. 8/8–9). Their interpretation as something more than ordinary pendants is supported by the presence on them of markings in the form of concentric rings made with a punch. However, perhaps this is only a form of ornament and not any special mark indicating a specific weight. The first of the described finds (Pl. 8/8) has a length of 19.6 mm, a maximum width of 9.7 mm, and a weight of 6.200 g. The second has the form of a quadrangular bucket, with a height of 11.5 mm (without the loop), 18.98 mm (with loop), width of 9.53/10.68 mm, and a weight of 4.906 g (Pl. 8/9). The weight of both these objects – even if with some allowance is made for their preservation – is incompatible with the metrology of Boii coins from their minting Period A as defined by CASTELIN (1965).

The next find with a similar mark may be more readily identified as a weight owing to its form. This is a hexahedron, measuring 12.78 × 10.72 × 5.18 mm with a weight of 5.042 g (Pl. 8/10). On one of its faces is a central ring with a dot in the centre and four additional dots, one in every corner. This object survives complete, with no traces of any attachments or soldering. Despite obvious stylistic similarities, this time it is also too hard to claim as having any connection with a Boii weighing system from the pre-oppida times.

A separate, fairly uniform group comprises a few dozen bronze objects, most of them in the form of hemispheres or cones or, more rarely, discs (Pl. 8/11–18). A few might be claimed as part of a set owing to their weight distribution. The heaviest of them is a hemispherical specimen with a diameter of 14.6 mm, a height of 7.8 mm weighing 6.790 g (Pl. 8/11). The weight of another specimen, its shape approximately that of a section of a sphere with a diameter of 11.7 mm, a height of 8.2 mm, is 4.8 g (Pl. 8/12). Intermediate specimens have a weight close to that of the conical object with a diameter of 11.6 mm, a height of 6.8 mm and a weight of 2.609 g (Pl. 8/13). The lighter group is represented by a specimen with a diameter of 9.3 mm, a height of 4.69 mm and a weight of 1.761 g (Pl. 8/14), and another, with a profiled base and a diameter of 10.2 mm, a height of 4.5 mm and a weight of 1.627 g (Pl. 8/15). A

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lighter category of the discussed finds is represented by a specimen in the form of a disc, with a diameter of 7.9 mm, thickness of 3.5 mm and a weight of 0.933 g (Pl. 8/16). Of similar weight (0.758 g) is another hemispherical specimen which has a diameter of 6.5 mm and a height of 4.3 mm (Pl. 8/17). One of the lightest specimens has the form of a section of a sphere with a diameter of 5.1 mm, a height of 2.3 mm and a weight of 0.23 g (Pl. 8/18). At present nothing is known about the presence of similar objects at Němčice. On the other hand a whole series has been recorded at some unnamed sites on the Danube (Jandrasits 2003, 79–80, catalogue no. 1–16), probably at Roseldorf and Etzersdorf. Not only is their form highly similar to that of the finds from Nowa Cerekwia, as for instance a specimen with a profiled base (Jandrasits 2003, 80, fig. 10), but also their weight span is similar. Jandrasits interpreted these finds as coin weights, matching them somewhat dubiously to the chronologically and geographically mixed denominations of Boii coinage. Nevertheless there is no doubt that some of these objects do have a weight compatible with that of Boii coins from Castelin's minting Period A and may be interpreted without much doubt as coin weights. This is true of the specimen weighing 2.609 g (Pl. 8/13), which corresponds to the weight of a 1/3 stater, an Athena Alkidemos type, or specimens weighing 0.933 g (Pl. 8/16) and 0.758 g (Pl. 8/17), which without any problem can be matched with Roseldorf type obols. What remains a problem is how to explain the weight of other objects in the discussed group. It seems very likely that some of them – especially those in the form of a disc – possibly unfinished or mis-struck – flans of silver or gold plated coins (*subaerati*). This applies to a disc weighing 0.933 g, which may have been the bronze core of a plated 1/8 stater or an obol *subaeratus*, of early type (with star or Roseldorf I), and the smallest of the finds to be described here, a disc with a weight of 0.23 g – a plated 1/24 stater of the Athena Alkidemos type. We cannot rule out that the rest of the artefacts which have a weight that does not correspond to that of the Boii coins of minting Period A – are also weights. This is supported by their standardized shape and the recurrence of form, recorded in other, more distant settlements of a similar character (Etzersdorf and Roseldorf). Perhaps the system of weights used by the Celts was much more complex than might have seem at first to be the case, and the estimated weights may correspond to units that we still do not understand. This dilemma may be resolved only by a meticulous analysis of coin metrology made on a larger series of this type of find.

Before closing this section we need to mention finds which supply evidence of local bronze working – casting (Pl. 8/19), ingots (Pl. 8/20), and lumps of bronze solidified in the vents of casting moulds (Pl. 8/21–22). One confirmation of this form of production activity in the settlement of Nowa Cerekwia is a crucible made of clay containing graphite with a residue on its walls of corroded green-coloured metal, discovered during the Czerska's field-works (Pl. 8/23). Crucibles of similar size, also with a metal residue on their walls, are known from La Tène open settlements from the Middle La Tène period in Moravia (Čižmář 2002, 253) and from Lower Austria – for instance, yet again from Roseldorf (Holzer 2003, 688) and Michelstetten (Lauermann 2010, 81, fig. 26, pl. 98).

Numismatic finds

From the many seasons of archaeological excavations on the site of Nowa Cerekwia made before 2007 we had an unimpressive series of just three coins. Two of them – a 1/8 stater, of the Athena Alkidemos type and an obol of Roseldorf II type – were discovered in the fill of previously excavated features. The third – an obol, also of Roseldorf II type – is a stray find. All the later finds were from secondary deposits.

The 1/8 stater, a Athena Alkidemos type (Castelin 1965, 20, no. AA–II/5, pl. 3/39) (Pl. 9/1) was discovered inside a feature recorded as 'House no. 16' investigated in 1962 (Czerska 1964, 124). This was a sunken structure 4.4 × 3.1 m, its longer axis aligned east–west. Its fill also contained a fragment of a sapropelite bracelet and 542 sherds,[9] a few fragments of daub and some animal bones. Unfortunately, nothing more is known about these finds owing to the inadequate nature of their publication. Equally little is known about the other pit-house, recorded as 'House no. 12' excavated in 1960, which yielded the Roseldorf II type obol (Dembski 1991, 6, 8, no. 2) (Pl. 9/2). This feature was of rectangular plan, 4.2 × 3.5 m, its longer axis aligned north–south, and a depth of 25–30 cm measured from the top. At each end of the axis of this feature was a posthole. Next to the obol the fill of 'House no. 12' there were

9 446 from wheel-thrown vessels, 201 of them containing graphite, and 96 sherds from coil-built pots (Czerska 1964, 124).

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three iron objects; a needle, a hook, and an ingot, as well as 134 sherds,[10] 33 fragments of daub and 16 animal bones. Similarly as in case of 'House no. 16' closer dating of this material is not possible not the least because of the standard of its publication, though we do know that the dating of both these features falls within phases LT B1–C2 which, according to our current state of knowledge,[11] are the chronological limits of the settlement at Nowa Cerekwia.

Coins are the largest group in the inventory of finds from the fieldwork carried out in 2007–2008 and number 211 specimens. If we include four coins discovered before 1973 and approximately a further 30 from detectorist finds we arrive at a total of around 245 coins,[12] of which at least 62 are gold – both complete and clipped. The total number of coin finds from the settlement at Nowa Cerekwia is hard to specify more closely. This is because the number of finds made after 2008 is unknown. According to unofficial figures in the period 2009–2013 treasure hunters may have recovered as many as 500 coins. Thus, we may estimate that the grand total of coins discovered at Nowa Cerekwia to date may be even as high as 800 specimens.

Statistically, the spread of the recorded fragment of this coins series is similar to that of the coin finds inventory from Němčice (cf. Kolníková 2006, 4, table 1; Kolníková 2012, 12), although with some apparent differences. In general, the group may be divided into three groups all from the same chronological period: local Celtic coins, foreign Celtic coins and non-Celtic coins.

In group 1 the ratio of gold to silver coins is evidently higher than at Němčice. At Nowa Cerekwia gold specimens are represented entirely by coins of the main series. These are staters of Nike, Paulsen no. 3–22 (Pl. 9/3), Plumlov (Kolníková 1998, 22, fig. 1/1–4) (Pl. 9/4–5) types and all the smaller denominations of Athena Alkidemos type (Castelin 1965, 19, as AA-I, II), and staters with various barbarized iconography: 1/3 (Pl. 9/6–8), 1/8 (Pl. 9/1, 9–10) and 1/24 (Pl. 9/11–15). Notable also is a very small representation of *subaerate* coins. In the recorded part of the coin find series from Nowa Cerekwia there are only three such coins: a stater and two 1/3 staters (Pl. 9/16–17). A unique specimen is a clipped fragment of a stater with a clear representation of Athena holding a shield (Pl. 9/18). This, the one and only specimen of this variant recorded at present, may be regarded as unassailable proof that stylistically clear uncorrupted prototypes of Plumlov type staters, did exist. On the obverse of all coins of this type discovered at Nowa Cerekwia there is a distinct head of Pallas Athena in wearing a Corinthian helmet and with the head turned to the right, and on the reverse – without a shadow of doubt – Athena Alkidemos advancing left and holding her shield upraised to the left. Their comparison with the already known material leads us to conclude that on all staters of the Paulsen no. 48–58 types, where the outline of the figure on the reverse is identifiable, the depiction is of Athena 'Defender of the people', and not of the winged Nike. In case of other specimens of Plumlov type the situation presumably is the same, but owing to the deterioration of the sharpness on the die this cannot be ascertained conclusively. Thus, formally staters of this type should be classified as the Athena Alkidemos type – something that was done by Paulsen (1933, 10), Castelin (1965, 11) and Ziegaus (1997, 214). Notable at the same time is the low frequency not only from Nowa Cerekwia in the material record, of stylistically good gold denominations of Athena Alkidemos type, such as the unique stater (Pl. 9/18), or 1/8 stater (Pl. 9/9). Among 1176 coins from the settlement of Němčice, taken into account in the 2012 study, there are only a couple of minor gold coins (1/3 and 1/24 stater) struck with dies not worn by use and distortion (cf. Kolníková 2012, no. 20, 76). The number of specimens with a clear obverse including also those with a slightly distorted iconography, is only a little higher.[13] It seems quite likely therefore that even during minting Period A gold coins from the oldest emissions were being withdrawn from circulation after a relatively short time, replaced with new ones – with a barbarized iconography. The most obvious explanation of

10 117 fragments of wheel-thrown vessels, 47 containing graphite, and 17 sherds from coil-built vessels (Czerska 1963, 299). The number of finds from this feature is certainly smaller when compared to the average for other pit-houses investigated at Nowa Cerekwia Site 4.

11 This takes into account the material from the latest excavations and the as-yet-unpublished finds from fieldwork carried out in 2007–2008.

12 Total as of 2008.

13 These are: three coins with a denomination of 1/3 stater (Kolníková 2012, 15, no. 20–22), five with a denomination of 1/8 stater (Kolníková 2012, 17, no. 40–41, 43–45) and five with a denomination of 1/24 stater (Kolníková 2012, 22, no. 76–80).

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this practice is that the weight standard was being reduced because throughout this period the metal standard apparently did not change.

A vast majority of the numismatic finds from Nowa Cerekwia are minor silver coins, conventionally described as obols. A considerable number of them are poorly preserved. Given the good condition of two specimens discovered in 1960–1962 we may assume that the surface of these more recent coin finds was damaged by chemical action (including lime) used as crop fertiliser. It is hard to assess the impact of corrosion on the reduction of the weight of individual coins but we need to take this factor into account when making statistical analyses. Almost without exception the obols are the main types known for the territory covered by the coinage system of the Boii. The list opens with coins with an image on the reverse of a horse prancing right, with above, a star-shaped symbol (Pl. 9/19–21). As a rule they are fairly poorly preserved, their weight being in the range of approximately 0.95–0.85 g. Coins of this type used to be described in numismatic literature as 'lyre-star' type (Jandrasits 2005, 144, no. 4) and type A 'with lyre' within the group Roseldorf/Němčice (Kolníková 2012, 33). However, as will be noted these terms no longer appear to be adequate.

The next sub-group are obols with an image of a horse prancing right, but without the star (Pl. 9/22–23) known in literature as Roseldorf type I (Dembski 1991, 6, no. 1) and classified by Kolníková (2012, 33) as further variants of type A 'with lyre'. Most of them survive in poor condition and in a few cases it is uncertain whether above the horse there was originally a star or some other symbol. The weight of specimens classified as Roseldorf I type is in the range of approximately 1–0.8 g, but there are specimens, poorly preserved at that, but weighing as much as 1.215 g (Pl. 9/22). The last sub-group are obols with a depiction of a horse prancing left (Pl. 9/2, 24–27), known in literature as Roseldorf II type (Dembski 1991, 6, 8, no. 2), classified by Kolníková as further variants of type B 'with lyre'. Interestingly enough, these smallest Boii coin fractions were further subdivided into smaller parts (Pl. 9/27); presumably because there was need to obtain even smaller denominations necessary for exchange.

In the representative series of 117 coins found up to the autumn of 2008 obols are represented by 13 specimens of the type 'with star' (11.2%), Roseldorf I by 53 (45.7%), and Roseldorf II by 44 (37.9%). This result differs visibly (Fig. 2) from the percentages obtained for individual types in the catalogued series from Němčice (Kolníková 2012, 33, 50), which are respectively: 66 (7.9%), 82 (9.9%) and 575 (69.2%). Also, among obols from Roseldorf there is an apparent quantitative domination of type Roseldorf II. Perhaps, these differences are the result of differences in the chronology (?) of the three sites under discussion.

Fig. 2. Comparison of types of obols represented in collections of coins from Nowa Cerekwia (left) and Němčice (category 'others' includes unidentified specimens and types other than listed).

The next group of coin finds from Nowa Cerekwia (group 2) comprises at least three 'foreign' (imported) Celtic coins. One of them is a clipped fragment of an Eastern Celtic tetradrachm (Preda 1973, 29–47, pl. I–IV), with a clear early imitation of Philip II of the first series (Pl. 9/28). The obverse image is that of a bearded head of Zeus laureate right, and on the reverse, a horseman right. Before the horse's chest are letters O V arranged vertically – the final letters of the Greek inscription Φ I Λ I Π Π O Y – and at centre a straight and deep incision. The angle of the truncated rims suggests that the cut was made from the obverse. The described fragment represents only half of the flan. The next, arguably, foreign coin, even though it represents a form of Boii coinage, is a clipped tetradrachm (Pl. 9/29) – presumably, the 'lyre/lyre' type in the classification of Kolníková. A specimen of this type was discovered at Němčice (Kolníková 2012, 24, VIIa, no. 169, fig. 11/169; 84/169). Another 'foreign' Boii coin is an obol with an

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obverse image of a man's head and, on the reverse, a horse prancing left, with above, a triskele (Pl. 9/30). With a weight of 0.877 g this coin is a rare type, most likely to be associated with tetradrachm emissions, such as the specimen described earlier, with the so-called 'lyre symbols' (Kolníková 2006, 36). For the time being close analogies are known only from Lower Austria which area also has a record of other variants of obols with a very similar reverse (Jandrasits 2005, 129, nos. 3a, 3b, 3c). Finds of minor silver coins with a highly similar reverse representation are known also from Nitra (Kolníková 1964, 198, fig. 4/1) in south-western Slovakia.

Coins are not the only numismatic object made of gold and silver in the finds from Nowa Cerekwia. This assemblage includes also several dozen gold ingots, originally in the form of thick discs (Pl. 10/1) or rods (Pl. 10/2). One of these objects resembles in its shape a hemispherical, unfinished coin flan (Pl. 10/3) apparently cast in a clay mould for coin blanks (*Tüpfelplatte*). Apart from these finds, another confirmation of the local production of gold coins at Nowa Cerekwia is the fragment of a gold rod with constrictions at regular intervals (Pl. 10/4). With a length of 13.25 mm and a maximum width of 2.89 mm the ingot weighs 0.988 g which corresponds to the weight of three 1/24 stater coins of minting Period A. This find is likely to be an ingot used in the production of these coins adjusted *al marco*.

The settlement site at Nowa Cerekwia also yielded a number of lumps of raw silver of a standard weight. Two of them weigh around 4 g and may be interpreted as melted down drachms. Even more notable however are two other silver lumps of regular shape and very similar in weight, 1.165 g (Pl. 10/5) and 1.154 g (Pl. 10/6). Their half-domed shape and nature of their surface suggest casting in a clay mould. Taking into account the weight of obols recorded in the settlement it is safe to interpret these as flans of early coins of this denomination – presumably, the type 'with star' or Roseldorf I. Given the circumstances presented here of naming the entire group of these coins as Roseldorf I and II (Dembski 1991, 6, 8, no. 1 and 2), and Roseldorf–Němčice (Kolníková 2012, 33) appears to be lacking in precision and inadequate for what is needed to classify this material. A more appropriate term for these coins would be 'Roseldorf–Němčice–Nowa Cerekwia', justified by these three centres of minting and trading. These connections are apparent in the numismatic material to the extent that it is hard to specify which types of Boii coins from the main series from minting Period A were struck in Upper Silesia and which were possibly imported from Moravia and from Lower Austria (if any). The numismatic material from these sites forms a group remarkably uniform in terms of iconography and metrology. Basing on the comparative analysis of coins finds from each of these sites it seems likely that the same dies – transported from place to place – were used in the mint production at Nowa Cerekwia, Němčice and at Roseldorf (Pl. 10/7).

Group 3 in the numismatic inventory from Nowa Cerekwia closes with imported coins, non-Celtic – at least nine Greek bronzes. The oldest of them is a coin of Philip II of Macedon (Pl. 10/8) with the monogram comprised of ligated letters AV on reverse (SNG ANS 8, no. 896). This bronze type was struck in vast quantities, presumably at Pella and Amphipolis, while this ruler was alive (359–336 BC), and possibly also after his death as well (Le Rider 1977). The next coin is a bronze of Kroton in Bruttium (Pl. 10/9) with an obverse representation of the god Aesaros right and on its reverse inscription AΙΣΑΡΟΣ and a representation of a thunderbolt and inscription ΚΡΟΤΩΝΙΑΤΑΝ on the reverse (BMC 111; Rutter 2001, 2236) from c. 300–250 BC. Even so, the largest group is that of Sicilian coins of Hiero II (4 specimen) ruler of Syracuse in 274–216 BC (Pl. 10/10). The obverse image is that of the bearded head of Poseidon with, on the reverse, a trident and inscription ΙΕΡΟΝΟΣ (SNG COP, nos. 844–856). Next, there is an AE *pentonkion* (denomination based on the Sicilian Litra – 5/12 of the base weight) actually, a half of it, of the Mamertines of Messana (Pl. 10/11) from around 212–200 BC. On its obverse is the head of Zeus, right, on the reverse a warrior and inscription ΜΑΜΕΡΤΙΝΩΝ (Förschner 1986, nos. 482–486).

Finds of Greek coins, so numerous in the settlement at Němčice, would have entered to Central Europe with Celtic mercenaries returning from service in the Mediterranean region (Baray 2014). Silver coins – like the tetradrachm from Wrocław-Psie Pole – may have been the object of barter on a par with Celtic coinage. Their small number when compared with finds of coins struck from copper alloy suggests however that they were more likely to be recast for use in local minting (cf. Čižmář *et al.* 2008, 687–690). Bronze coins – not in circulation within the Boii system – may have served as souvenirs

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of distant travels or votive offerings, eventually as a handy stock of valuable metal. Celtic mercenaries could get them probably as *sitonion* also *siteresion* or *sitarchia* which is a name referred to rations in kind or the equivalent amount in money – i.e. money intended for the purchasing of rations (cf. Liampi 2000). In the history of coinages of Athens is reported by literary sources (pseudo-Aristotle, *Economics*, 1350a; Polyaenos, *Stratagems*, 3.10.14) that general Timotheos when he was besieging Olynthos (363–359 BC) due to lack of silver went on to issue bronze pieces in order to cover the needs of his troops. The purpose of the emission becomes evident in the detail of the kernel of wheat on which the owl is standing: there is no doubt that these coins were struck in order to cover the daily distribution of grain to the soldiers – *siteresion* (Stoyas 2008).

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Finds made in recent years have placed the settlement at Nowa Cerekwia in an entirely new light. When assessing its significance and character we need to be aware that we have at our disposal only a fragment of the original body of data relating to this centre. The area of the Celtic settlement which has been destroyed by long years of basalt extraction is hard to assess but must have been substantial. According to the Czerska's calculations – completely mistaken in this writer's view – the settlement occupied an area of around 1.2 ha, with a further 0.5 ha used as its economic catchment. A diametrically different view though also incorrect, was presented by Pescheck (1970). In his reconstruction the basalt outcrop used to be the site of an oppidum – or a Celtic proto-urban settlement – which extended supposedly over an area of about 104 ha. This view was calculated using the description given by Kleemann of a double ring of banks and ditches enclosing the settlement, their remains allegedly still visible before the outbreak of WWII to the east and the south-east of its investigated fragment. Putting aside the veracity of the information about the existence of traces of earthworks near to the settlement it must be said that the settlement at Nowa Cerekwia, if only because of its chronology, cannot have been an oppidum. Presumably it was an open settlement, at least 6 ha in area. Armed with the record on the rectangular sanctuaries discovered at Roseldorf, and their presence confirmed by the geophysical survey at Němčice it may be safe to interpret the information outlined at the introduction to this study concerning the discovery of particularly weapons in the early days of basalt extraction (Newrzella 1981, 16) as very likely that these were votive offerings, similar to those discovered in the fill of ditches around the sanctuary at Roseldorf (Holzer 2009).

The settlement at Nowa Cerekwia was already in place during phase LT B1. This is confirmed not only by the discovery of a burial within a rectangular ditch (Bednarek 1994), but also by the chronological spread of stray finds, such as the unfinished bronze bracelet (Pl. 6/4), attesting to the operation of a local bronze working workshop already during the Early La Tène (presumably LT B1). At the same time, the series of Early La Tène finds from Nowa Cerekwia is relatively small, suggesting that during this period it played a different role than later on. We have to keep in mind that most of finds are items of non-ferrous metals. Among the items of dress accessories are mostly those associated with women's dress. It cannot be regarded as reflecting the reality of the situation because men certainly inhabited the settlement as well.

The majority of the discovered objects must be attributed to the two stages of the Middle La Tène period (LT C1–C2), when the settlement was operating as a centre of production and commerce. This is confirmed by the large number of coins, mainly issues of the Boii, and of bronze dress accessories (fibulae, elements of chain belts), personal ornaments, as well as by glass bracelets and beads – some of which produced locally. The younger horizon of finds is designated by the large series of fibulae type Mötschwil. Among finds from earlier fieldwork and the most recent season not a single specimen can be dated to the Late La Tène (LT D1). This applies also to coins, all of which are issues from the minting Period A of Castelin (1965). A circumstance significant for the chronology of the Boii minting is that among the vast quantity of Celtic coins secured from the area of the settlement at Němčice, and also among the finds from Nowa Cerekwia, not a single specimen is recorded representative for the late La Tène minting of the 'mussel' period. The conclusion is that the latter was closely linked to the operation of oppida, and came into being – roughly speaking – only during the final quarter of the second century BC. The question occurs: did the production of coins of the Athena Alkidemos type of the main series end with the end of centres

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classified as type Nowa Cerekwia–Němčice?[14] The rather small series of finds of this type recorded or example in the oppidum Staré Hradisko in Moravia does not furnish a conclusive answer. Perhaps they are the earliest coins issued at that site but equally well they could have been brought in from outside during its early phase. While not pursuing this question further we may assert that the decline of production of minor Boii denominations with the recognizable depiction of Athena Alkidemos on their reverse belongs in the period immediately antedating settlement change across Central European Celtic territory, complete with the eclipse of settlements at Nowa Cerekwia and Němčice, or soon after.

The settlement at Nowa Cerekwia in its glory days would have been a centre of production and commerce of supra-regional importance – presumably the only centre of this type to the north of the Carpathians and the Sudetesland. One commodity – amber – was brought in from the north (Pl. 10/12), while gold and silver for the mints was brought in from the south, as also presumably was bronze raw material, glass and graphite (Pl. 10/13). There is no doubt that coins in circulation within the central settlement at Nowa Cerekwia and other commodities too, were trade goods. They passed not only to buyers living in satellite settlements in its immediate catchment such as the settlement at Raków (pow. głubczycki, woj. opolskie), from which site there is a type Roseldorf I obol, but were also traded over long distances. A major role was played by export to the territory inhabited by closely related Celtic groups to the east (the western part of Lesser Poland) and to the north-west (Lower Silesia). This exchange is evidenced by stray finds of gold coins of the Nike type (Wrocław-Psie Pole) and the Athena Alkidemos type (Świątniki, pow. wrocławski and Wojszyce – now Wrocław-Krzyki) and a hoard of the latter type from Brzezinka Średzka, in pow. średzki (Jahn 1931, 85, 88–90, 93, 95, pl. XII/6–8; Paulsen 1933, 14–15, 18, 30, 140–141, pl. V/93; VII/125, 149; Castelin 1966, 166; Woźniak 1967, 205–207, 223, pl. XIII/14–16; Castelin 1976, 241–243). Celtic gold coins also entered the territory what was then under Germanic settlement, now central Poland (Pl. 11/1). Equally we can interpret in a similar manner the influx of many other commodities, notably, bronze and glass ornaments, as well as dress accessories such as Mötschwil type fibulae and their derivatives (Pl. 11/2). The centre at Nowa Cerekwia owed its importance within the network of La Tène settlements not only to production and long-distance trade, but also, and perhaps, mainly, to its role as a mustering point for mercenaries. It is here that warriors from the north came, ready to serve in the eastern Mediterranean. Some of the mercenaries would have been Germanic, for there is no other way to explain the presence of Greek coins (Mielczarek 2008, map 1) in Germanic Jastorf and Przeworsk Cultures contexts in central Poland – in Kuyavia and western Mazovia (Pl. 12/1). Bronze Greek coins were definitely not an object of long-distance exchange. Germanic mercenaries – as well as Celtic – could get them probably as *sitonion*.

The Celtic settlement network in Upper Silesia declined probably during late part of LT C2 (Woźniak 1992, 13). We can link this process, one that is recorded in various forms, in other areas of Central Europe, to a concrete historical occurrence – the migration of the Cimbri and the Teutones, whose beginning is usually dated to around 120 BC though one should note that this date is only an approximation as the first point in this migration was the Battle of Noreia, where in 113 BC for the first time the Germans defeated the forces of Rome (Appianos, *Celtica* 13[15]). Classical authors record that before pushing into Noricum the Cimbri and Teutones had entered the territory of the Boii but were forced out from this area to the lands of the Scordisci and only from there did they march westward (Poseidonios in Strabo VII 2,2[16]). Very likely their route from Jutland ran through the territory of the Boii in Upper Silesia and then on by way of the Moravian Gate and down the valley of the Morava, to the lands on the Danube. The connection between the eclipse of Celtic settlement in Silesia with the migration of Cimbri and Teutones has been postulated in the archaeological literature for quite some time (Jahn 1932; Woźniak 1970, 233; Woźniak 1996, 168), but only now this theory has gained strong support. It is quite likely that the migration of the Cimbri and the Teutones also triggered profound settlement change as has been observed in Moravia. This has been reflected in the decline of the trans-regional centre of production and trade as

14 It is not through oversight that Roseldorf is not mentioned in this context, as from this comparable site we have a relatively large series of Boii coins from the mussel period, which may be referred to the late La Tène period. This means that the centre at Roseldorf continued to operate for longer than those at Nowa Cerekwia and Němčice. The findings presented here are based on the unpublished material in the keeping of the Kunsthistorisches Museum in Vienna.

15 Appian z Aleksandrii, *Historia rzymska*, transl. Ludwik Piotrowicz, Wrocław 1957.

16 Strabo, *Geographiká*, transl. H. L. Jones, Loeb Classical Library, Cambridge–London 1923–1924.

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evidenced at Němčice (Čižmář–Kolníková 2006, 269). During various stages of their movement east the Cimbri would have been accompanied by sub-groups of various Celtic tribes. Amongst them were also the Boii (Neuman *et al.* 2000, 497), some or all of them having possibly recruited from among Celtic population residing earlier in Silesia. This argument is supported not only by the decline of Celtic settlements in this region. A strong argument in its favour is finds of hinges of *Kronenhalsringe* in the form of tripartite rosettes from Nowa Cerekwia and Němčice (see earlier discussion). This is because they have very clear counterparts in the Jastorf culture of Schleswig-Holstein – the point of departure of the migration of the Cimbri.

The postulated connection between the decline of the settlement at Nowa Cerekwia and the migration of the Cimbri does not automatically mean that its direct cause was the destruction of this centre. This is because there is much to confirm that the passage of the Germans through the territory of the Boii was relatively peaceful. In any case, the investigations made at Nowa Cerekwia have identified no evidence of destruction to indicate that the end of the settlement was accompanied by major evidence of destruction. On the contrary, the presence of coil-built pottery with Jastorf and Przeworsk features (c. 13% of total ceramic finds) in the assemblage of finds from this site (e.g. Czerska 1963, 295, fig. 12/a–d, g; Woźniak 1970, pl. XXIV/1, 2), suggests that for a time the Celts and the Germans resided in the settlement side by side. The Jastorf pottery from Nowa Cerekwia finds good parallels in pottery classified as the Brześć Kujawski type (cf. Grygiel 2004), but not in the materials from Schleswig-Holstein or Jutland. Presumably the Cimbri chose to travel through Upper Silesia because it was occupied by friendly tribes of Germanic extraction and their Celtic allies. In any case it is likely that they set off south together with them. This would explain why in the account of the invasion of Cimbri of Italy given in the *History against the pagans* of Orosius the barbarian chiefs have Celtic names such as Lugius and Boiorix, suggesting their ties with tribes of the same name – the Lugii and the Boii.[17]

According to the latest evidence, for more than a half of a century afterward the movement of the Cimbri, the Głubczyce Plateau lay desolate. The Przeworsk culture settlement is recorded there only during the Roman phase B1, and is seen to flourish during B2 (Godłowski 1985, 27, 46).

With what we know at present the finds from Nowa Cerekwia closely resembles the material from Němčice and Roseldorf, although there are some differences, mainly chronological. For example, the archaeological record from Roseldorf includes coins from the oppida period, i.e., from phase LT D (cf. Dembski 2009, fig. B-8) which differs in the case of Němčice and Nowa Cerekwia. Also, it seems that the centre at Nowa Cerekwia was the probably earliest of the three to be established. The settlements at Nowa Cerekwia, Němčice and Roseldorf were sited in a similar landscape, on a hilltop, with a commanding position overlooking the surrounding land. Nowa Cerekwia, positioned at the outlet of the Moravian Gate, had a strategic significance for the control over communication routes connecting Moravia with the lands flanking the Odra and the Vistula rivers and, in a larger perspective commanding the southern regions of Europe with the Baltic Sea basin.

The distance between Nowa Cerekwia, Němčice and Roseldorf is similar and amounts to around 140 kilometres. In view of the similarity of the archaeological record, particularly, with regard to the numismatic finds from the three centres, we can hazard a guess that they were part of the same socio-political system. Possibly this structure may be identified as being related to the Boii and perceived as a federation of tribes. Within this grouping settlements of a type defined as Němčice–Nowa Cerekwia–Roseldorf played the role of central settlements of a supra-regional rank. Centres of this type – residences of the Celtic elite – were the foci of political, social and religious life, as well as of production and commerce. Most likely, they also served as mustering points from which warriors ready to hire out their services set off on journeys to the Mediterranean. The establishment of these central settlements may be linked to the historical events such as was the migration of the Cimbri from Jutland Peninsula to the Middle Danube, discussed at more length earlier in this text (cf. Rudnicki 2013, 55–57). It is striking that the majority of hoard finds[18] of gold Boii coins of approximately similar chronology[19] have been discovered spread the length of this route (Pl. 12/2).

17 This matter will be discussed in more detail in a separate volume of studies co-authored by the late Professor Jerzy Kolendo.

18 Possibly except for the deposit from Nechanice (Královehradecký kraj, okres Hradec Králové), which lies a little to the south from the line of the Sudetesland, and as such, from the reconstructed itinerary of the Cymbrian migration.

19 Ones that according to the published reports contained only gold Boii coins from the minting Period A.

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List of figures

Fig. 1. Locality of Nowa Cerekwia and of Celtic settlement within the present-day territory of Poland.

Fig. 2. Comparison of types of obols represented in collections of coins from Nowa Cerekwia (left) and Němčice (category 'others' includes unidentified specimens and types other than listed).

List of plates

Pl. 1. Nowa Cerekwia, distr. Głubczyce, woj. opolskie. An image of settlement (Site 4) and its surroundings developed using 3-D LiDAR data.

Pl. 2. Nowa Cerekwia. 1. View of the trench from the north; 2. 'House 1' at a depth of 60 cm from the surface, view from the south; 3. 'House 2' at a depth of 50 cm from the surface, view from the south; 4. Pottery kiln. (1, 3. photo: Georg Raschke, 1936; 2. unknown photograph 1936; 4. unknown photograph 1925. Source: Museum of Opole Silesia, inv. no. MŚO-A-F-0792, 0796, 0801, 0755).

Pl. 3. Nowa Cerekwia. Aerial photo of the Site 4 (photos: K. Trela). 1. View from north-east; in the distance are visible the Jeseniky mountain range in eastern Sudetesland; 2. The area of the settlement partially investigated in 2007–2008 and previously by B. Czerska.

Pl. 4. Nowa Cerekwia. Selected bronze finds from the surface survey carried out in recent years (drawing: E. Pazyna; photo: M. Bogacki).

Pl. 5. Nowa Cerekwia. 1. Half-product of a link from 'Middle German' type chain belt discovered during B. Czerska's investigation; 2–34. Selected bronze finds from the surface survey carried out in recent years (drawing: E. Pazyna; photo: M. Rudnicki).

Pl. 6. 1–15, 17–18. Nowa Cerekwia. Selected bronze finds from the surface survey carried out in recent years (drawing: E. Pazyna; photo: M. Bogacki); 16. Bronze anthropomorphic figurine from the settlement at Němčice (after Čižmář 2012); 19. The fastening of a bronze collar – *Kronenhalsringe* – from Söhren, in eastern Holstein (after Hingst 1964, without scale).

Pl. 7. Nowa Cerekwia. 1–15. Selected glass artefacts from the surface survey carried out in recent years (drawing: E. Pazyna; photo: M. Bogacki); 16. Ring-shaped bead of cobalt blue glass, type 155-Venclová from 'house 8' recovered in 1959 (photo: M. Rudnicki); 17. Ring-shaped bead of cobalt blue glass, type 155–Venclová from the surface survey carried out in recent years (drawning: E. Pazyna); 18–27. Selected bronze finds from the surface survey carried out in recent years (drawing: E. Pazyna).

Pl. 8. Nowa Cerekwia. 1–22. Selected bronze finds from the surface survey carried out in recent years (drawing: E. Pazyna; photo: M. Bogacki); 23. Crucible made of clay containing graphite with a residue on its walls of corroded green-coloured metal discovered during by B. Czerska in 1959 (photo: M. Rudnicki).

Pl. 9. Nowa Cerekwia. 1. 1/8 stater, Athena Alkidemos type; 2. Silver obol, Roseldorf II type; 3–15. Selected

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gold coins, Nike and Athena Alkidemos type; 16–17. Selected gold plated (*subaerate*) coins, Athena Alkidemos type; 18. A clipped fragment of a gold stater, Athena Alkidemos type; 19–27. Selected silver coins: obols, Roseldorf–Němčice–Nowa Cerekwia group; 28. Fragment of an imitation silver tetradrachm, Philip II first series type; 29. Fragment of asilver tetradrachm, presumably 'lyre/ lyre'type; 30. Silver obol. (photos: M. Rudnicki, M. Bogacki).

Pl. 10. Nowa Cerekwia. 1–4. Clipped fragments of gold bars; 5–6. Silver lumps; 7. 1/24 stater, Athena Alkidemos type from (A) Nowa Cerekwia, (B) Němčice, (C) Roseldorf (without scale); 8. Bronze coin of Philip II of Macedon; 9. Bronze coin of Kroton in Bruttium; 10. Bronze coin of Hiero II ruler of Syracuse; 11. Bronze coin of Pentonkion, Mamertines of Messana; 12. Raw amber discovered in 1957; 13. Raw graphite from 'House 12' discovered in 1960. (photo: M. Rudnicki).

Pl. 11. 1. Finds of early Boii coins (minting Period A acc. to Castelin) in Poland; 2. Finds of Mötschwil type fibulae and their derivates north of the Carpathians – larger dots: more than 3.

Pl. 12. 1. Greek coin finds in the Central European *Barbaricum* (star: Němčice nad Hanou; square: Nowa Cerekwia, after Mielczarek 2008); 2. Hoards with only gold Boii coins from minting Period A (1. Gorzów; 2. Brzezinka Średzka; 3. Trutnov; 4. Nechanice; 5. Plumlov; 6. The settlement at Nowa Cerekwia; 7. The settlement at Němčice.

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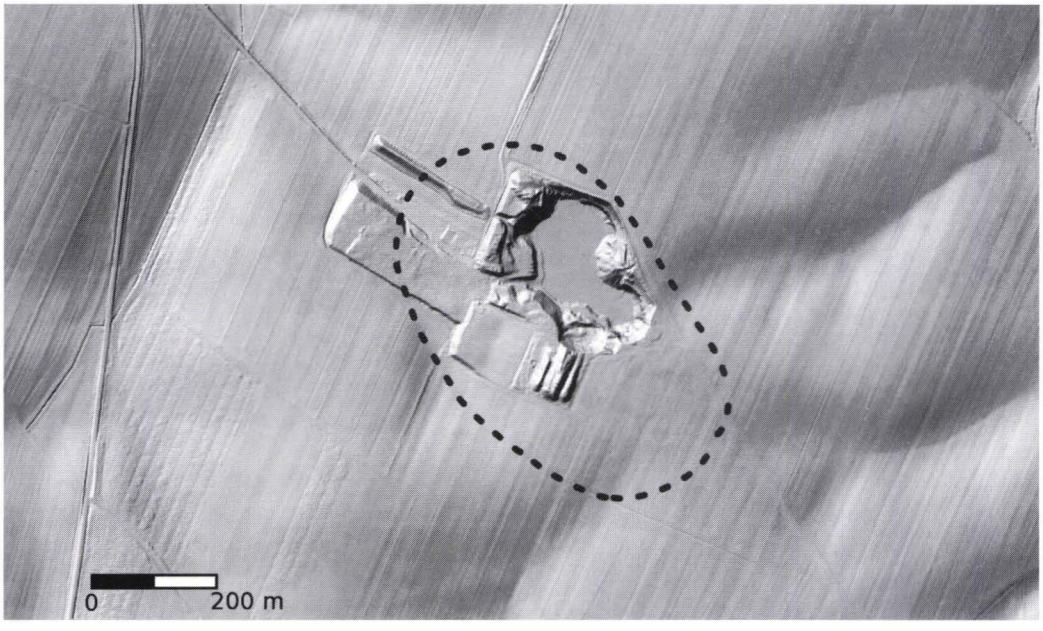

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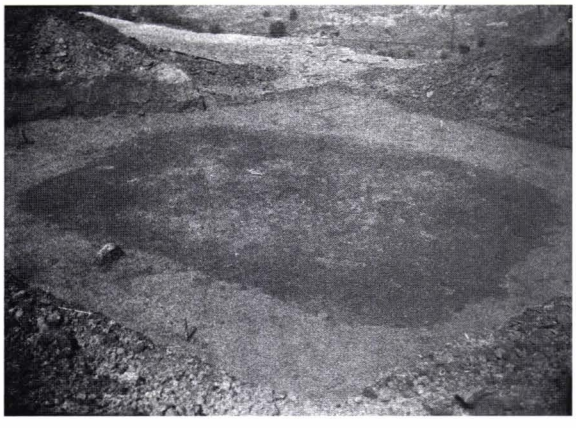

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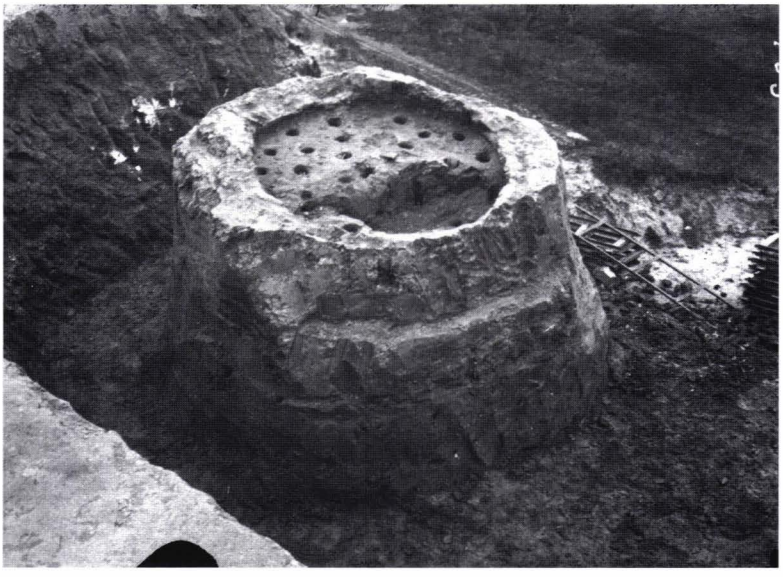

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Plate 2. Nowa Cerekwia. 1. View of the trench from the north; 2. 'House 1' at a depth of 60 cm from the surface, view from the south; 3. 'House 2' at a depth of 50 cm from the surface, view from the south; 4. Pottery kiln. (1, 3. photo: Georg Raschke, 1936; 2. unknown photograph 1936; 4. unknown photograph 1925. Source: Museum of Opole Silesia, inv. no. MŚO-A-F-0792, 0796, 0801, 0755).

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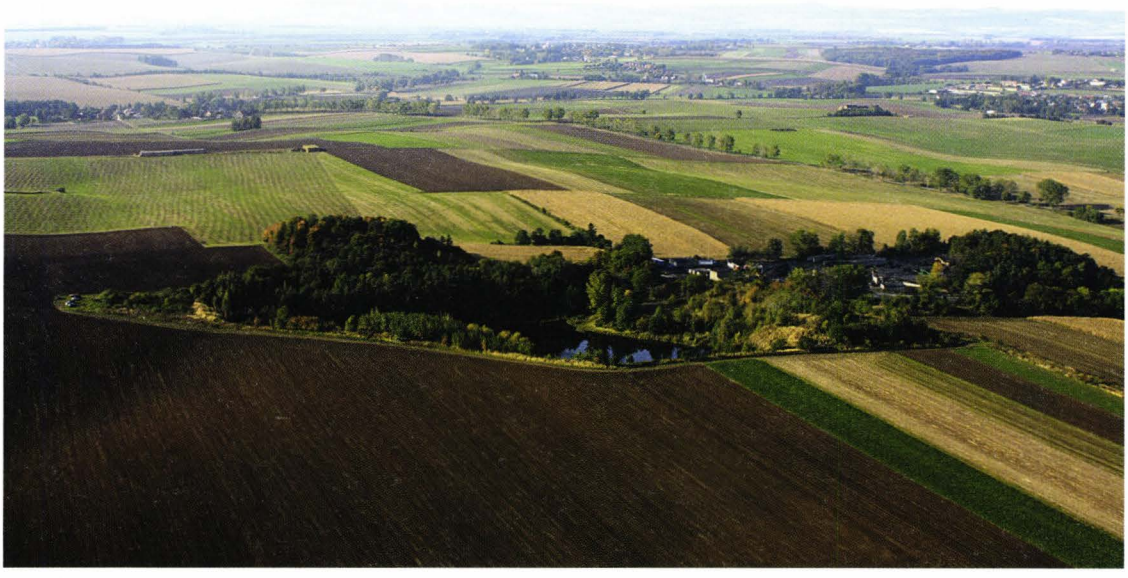

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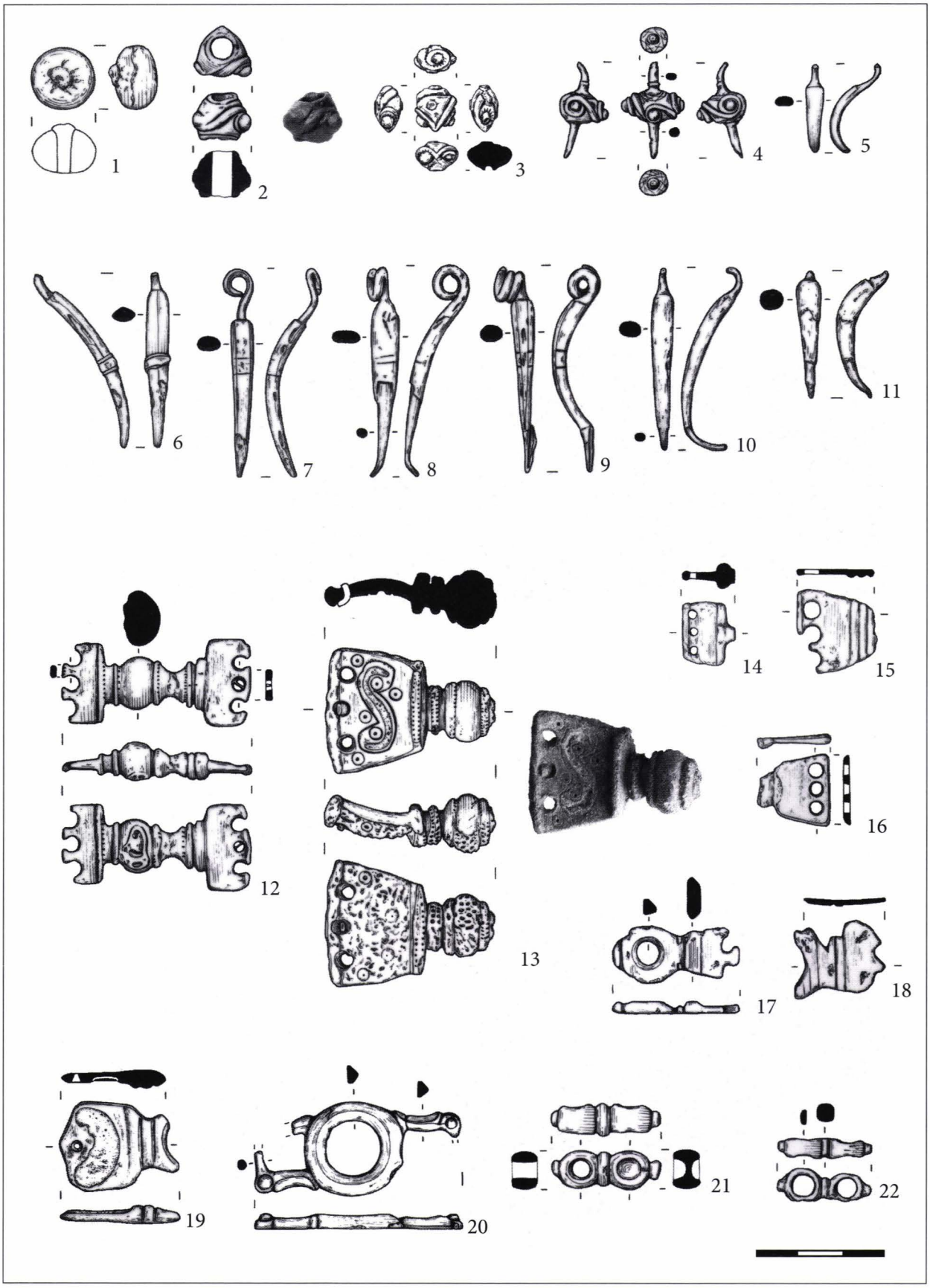

Plate 4. Nowa Cerekwia. Selected bronze finds from the surface survey carried out in recent years (drawing: E. Pazyna; photo: M. Bogacki).

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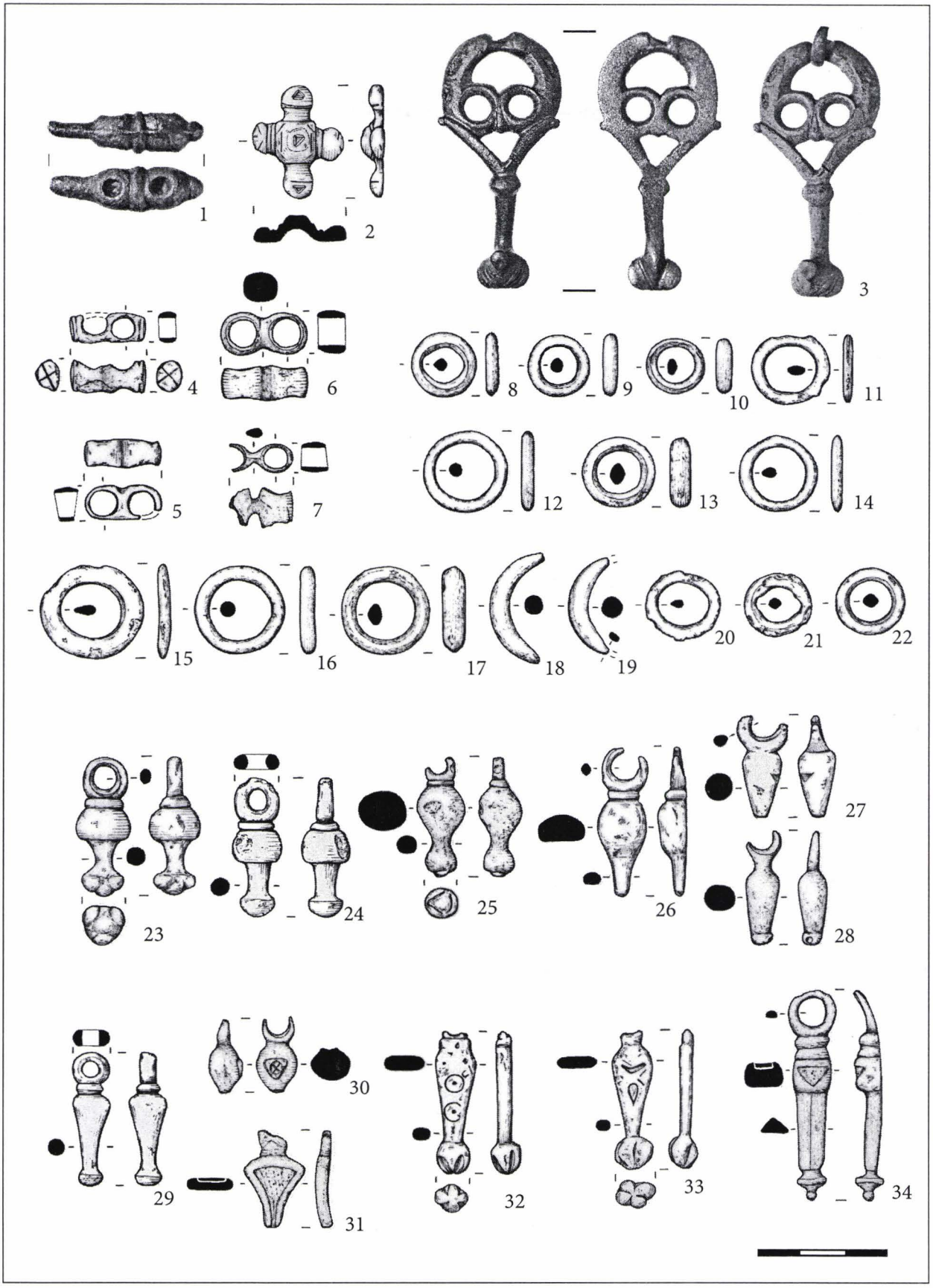

Plate 5. Nowa Cerekwia. 1. Half-product of a link from 'Middle German' type chain belt discovered during B. Czerska's investigation; 2–34. Selected bronze finds from the surface survey carried out in recent years (drawing: E. Pazyna; photo: M. Rudnicki).

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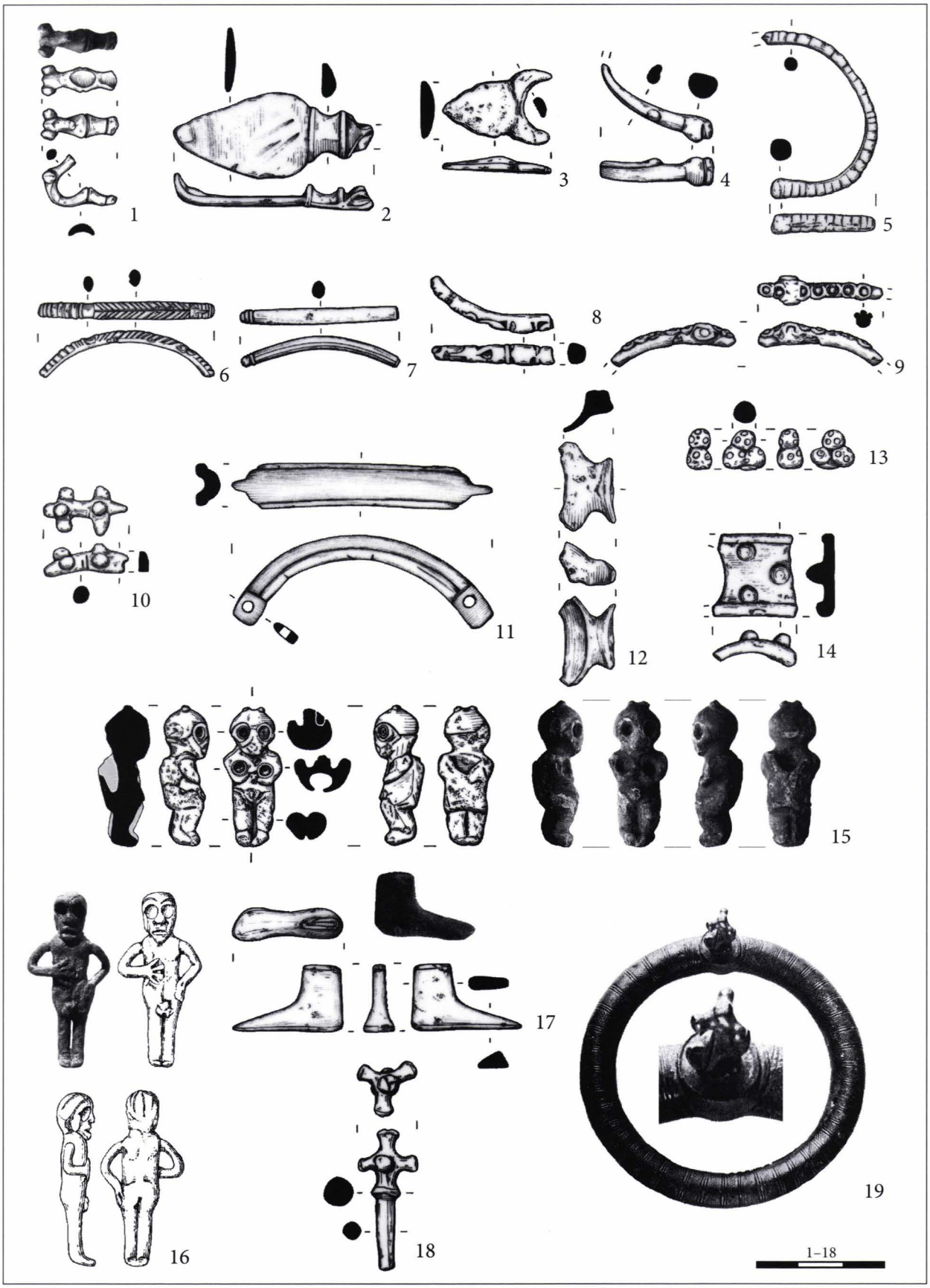

Plate 6. 1–15, 17–18. Nowa Cerekwia. Selected bronze finds from the surface survey carried out in recent years (drawing: E. Pazyna; photo: M. Bogacki); 16. Bronze anthropomorphic figurine from the settlement at Němčice (after Čižmář 2012); 19. The fastening of a bronze collar – *Kronenhalsringe* – from Söhren, in eastern Holstein (after Hingst 1964, without scale).

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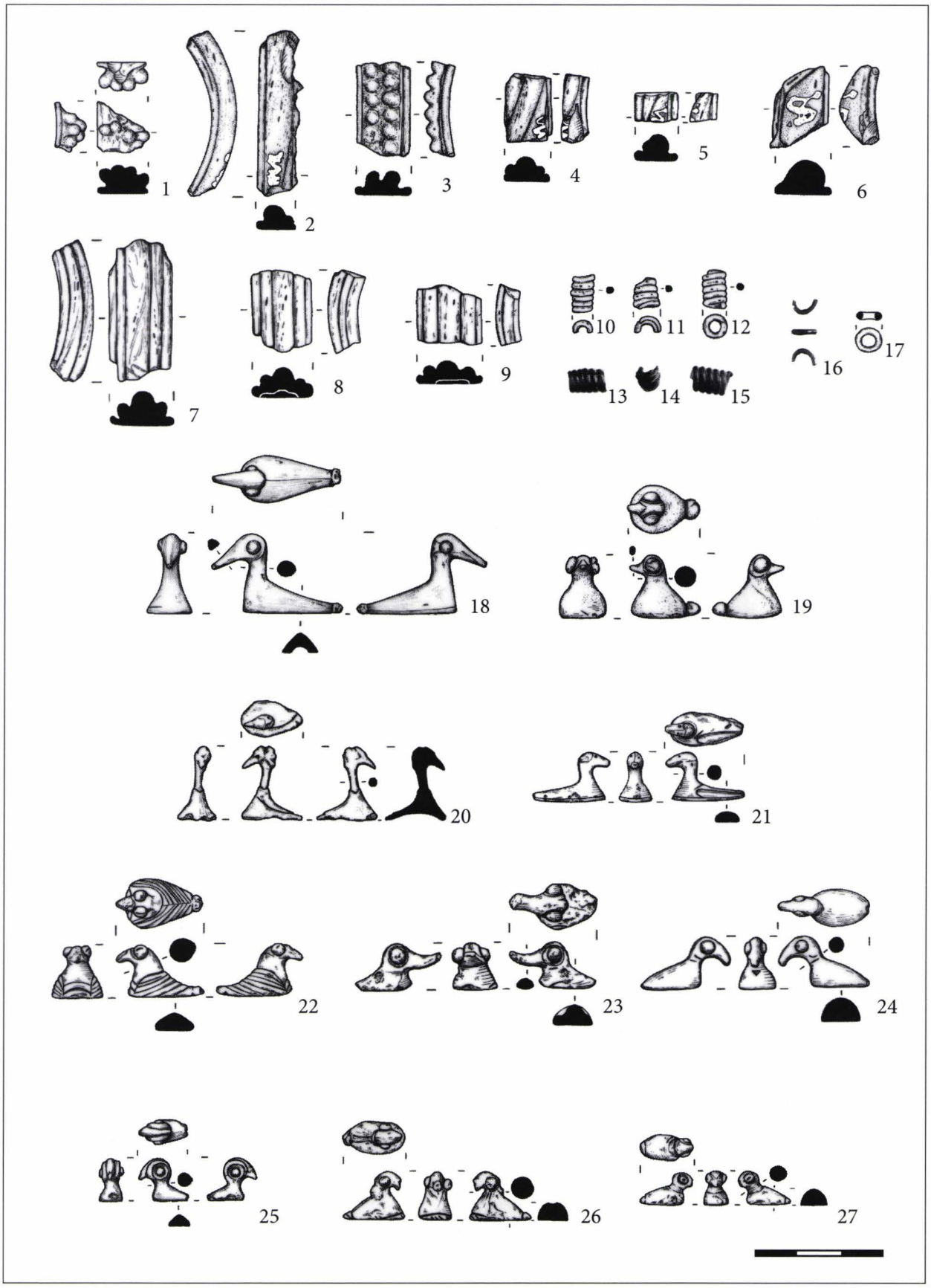

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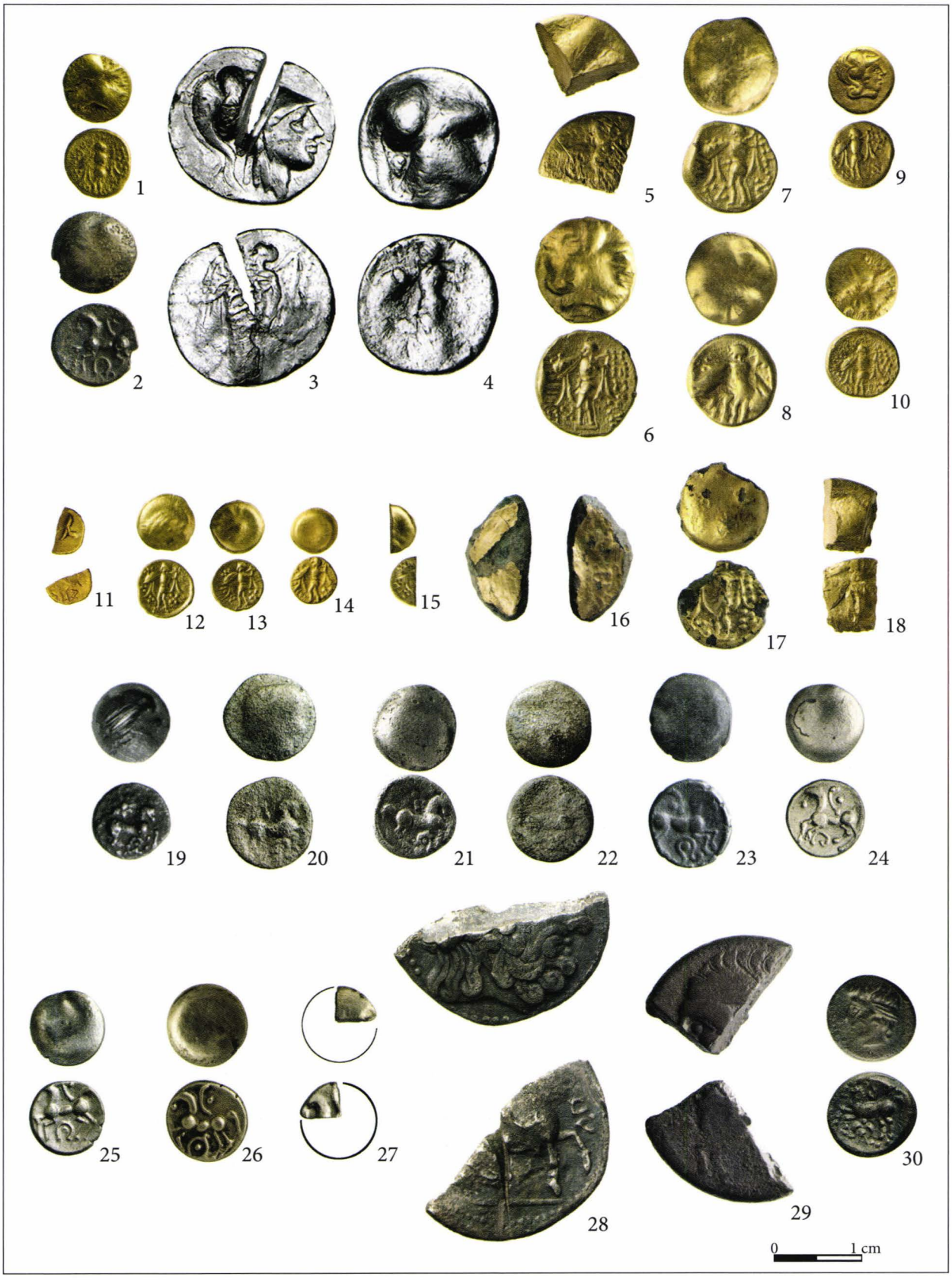

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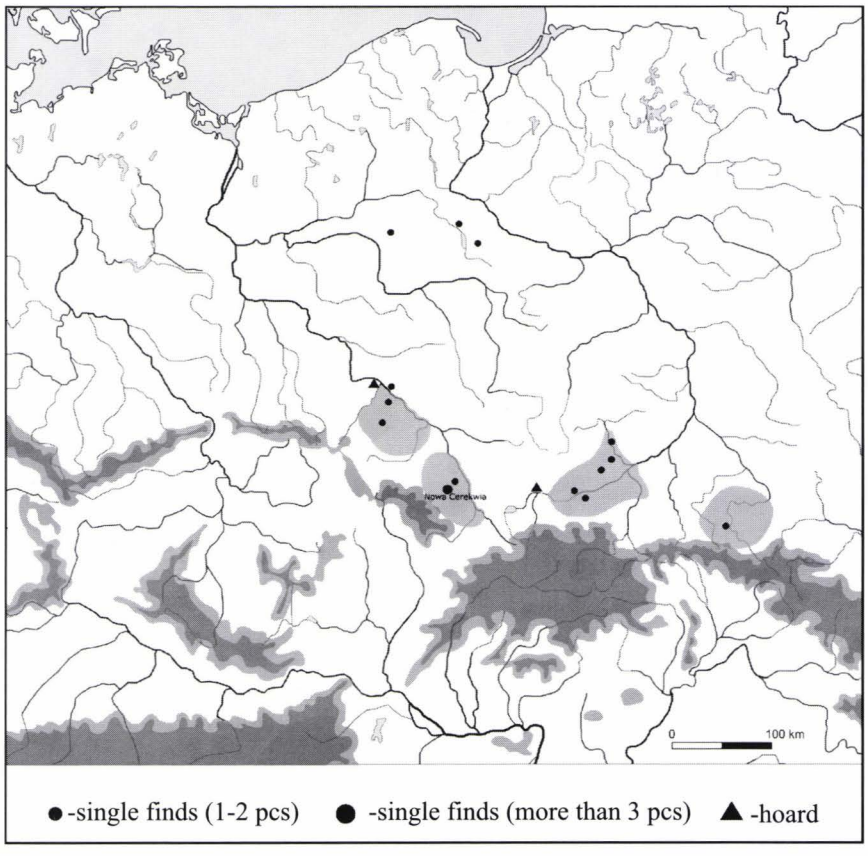

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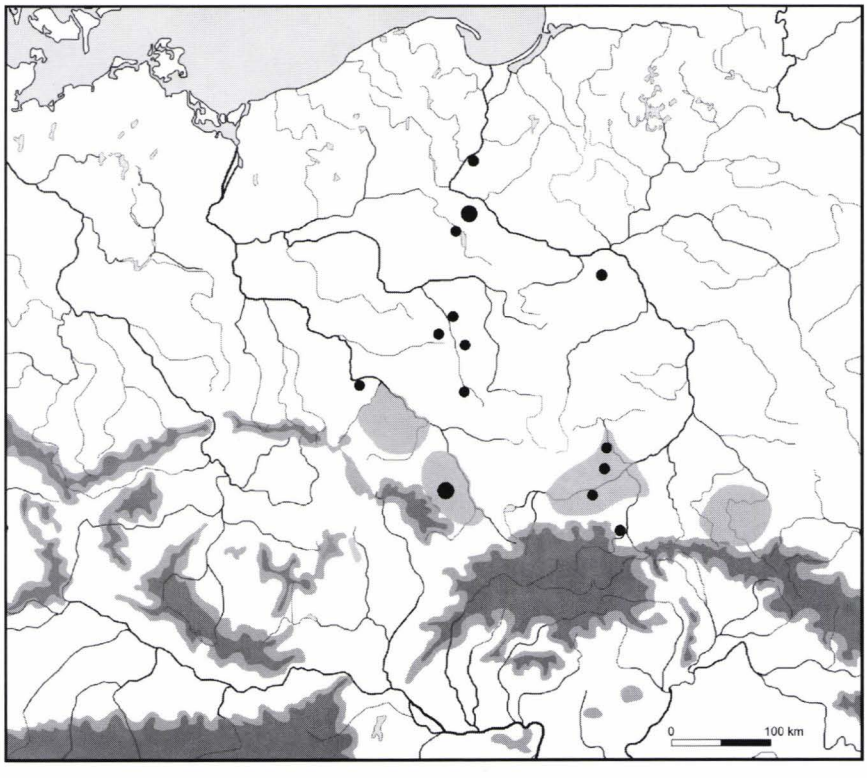

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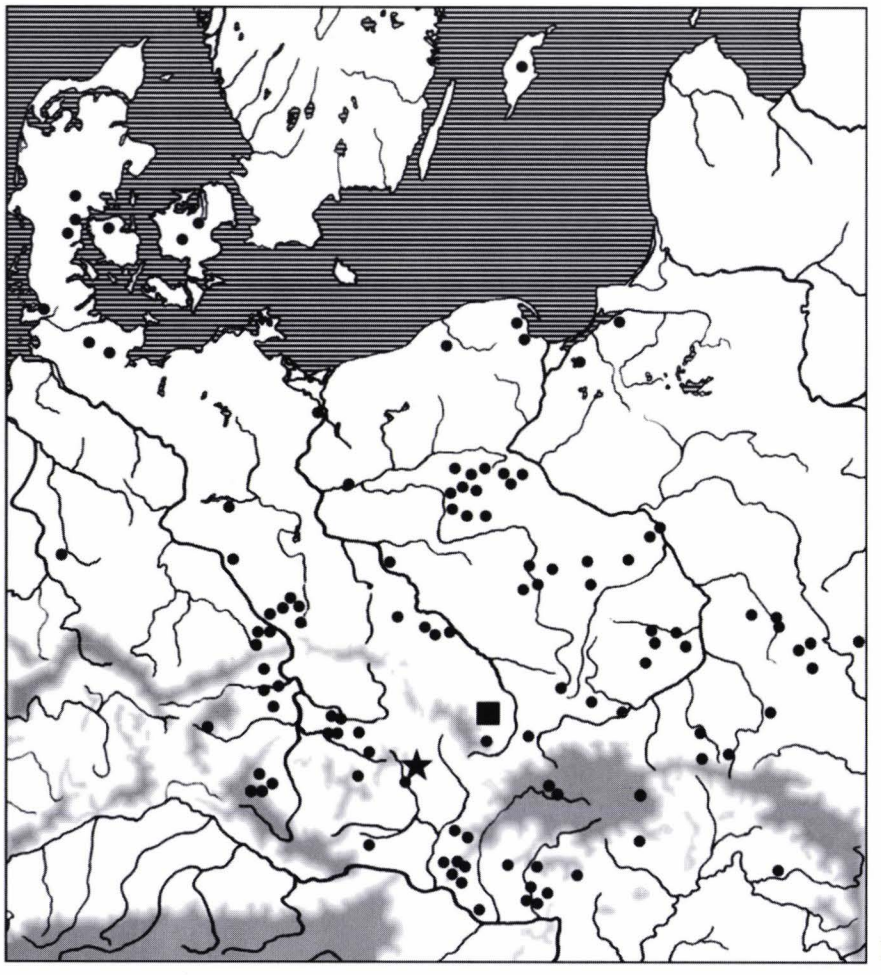

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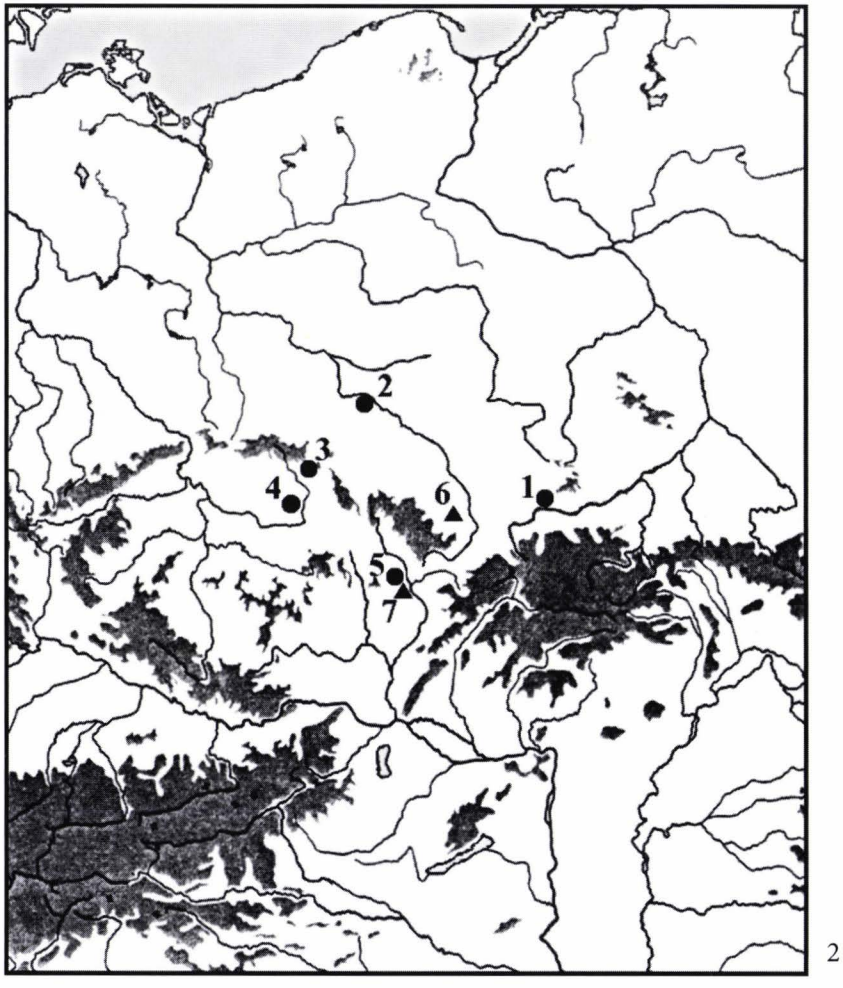

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La Tène Period Craftsmanship in Eastern Austria

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Keywords: Eastern Austria, craftsmen, graves, pottery kilns, pottery ornamentation

When approaching questions of prehistoric craftsmanship it is essential to identify information based on sources and to examine critically their past interpretation. Therefore, one should examine artefacts contained in burials, which are generally associated with crafts and craftsmanship. The funerary context may be seen in terms of a triangle (Brather 2008; Ramsl 2014, fig. 1b) formed by: the deceased, the social entity or *familia* who are tasked with arranging the funeral rites and, thirdly the participants – or local society – attending the funeral (Fig. 1). In this respect the role of the grave goods may be considered as: They are directly connected to the deceased; they demonstrate the status of the social group; and they represent the expectations of the local society.

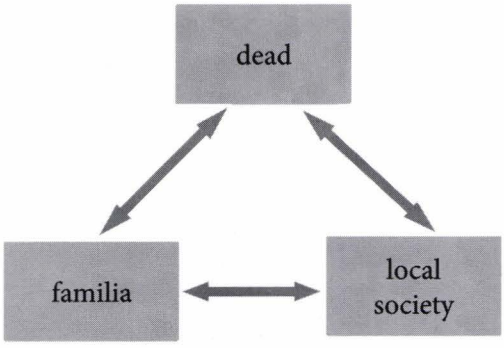

Fig. 1. The grave goods triangle.

The present paper deals with evidence of craftsmanship as it has been found during the La Tène period in the area of Eastern Austria. This region is characterized by two main areas of population accumulation: the Traisen Valley (Traisental) in the central part of Lower Austria, the surroundings of the Leitha Hills (Leithagebirge), which occur at the border of Lower Austria and the province of Burgenland. At the same time, these areas offer a link to the Carpathian Basin (see also Ramsl 2011; 2012a).

In this region several burials have been found with an inventory indicating that the individual in the grave was associated with craftsmanship. In the Traisen Valley, in the small pit of Pottenbrunn grave no. 48 (Ramsl 2002) the inventory consisted of four pots, three knives of different shape (one a clasp-knife), shears, one touchstone (or whetstone), scrap metal, some iron tools and a lump of resin (Pl. 1/1). All-in-all, this inventory indicates that the deceased might have been a leather worker or was engaged with the making of textiles, metals or bone/antler. Resin can be used as an adhesive for different materials, but also as a cushion for engraving work or generally as a working-surface. Next to this grave, grave no. 54 contained a chain and pendant made of bronze sheet and silvered the hollow pendant being in

Iron Age Crafts and Craftsmen in the Carpathian Basin, 2014, p. 71–82

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the form of the buffer-terminals of torcs found particularly in north-eastern France – an expression of the high skills of Celtic fine metalwork makers (Megaw *et al.* 1987)[1] (Pl. 1/2).

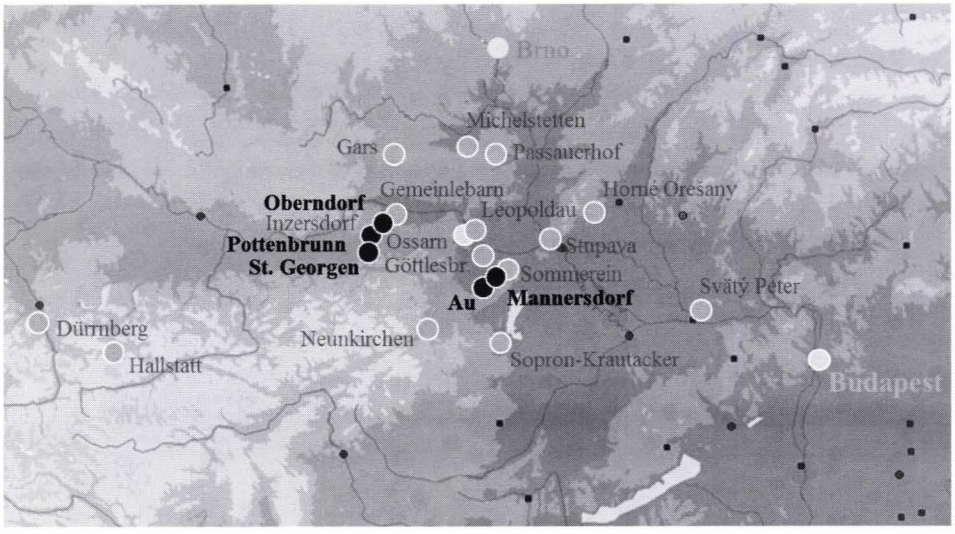

Fig. 2. Map of archaeological sites in Eastern Austria and the surrounding area mentioned in the text.

Grave no. 520 from the same cemetery of Pottenbrunn contained the burial of a 45 to 55 year-old male, initially interpreted as a priest or druid (Ramsl 2002, 142–143). But the grave good require us to reconsider his profession. Three knives of different forms were discovered in this grave – one probably a clasp-knife like that in grave 48 –, a touch- or whetstone, pestle, shears and finally a multi-functional iron tool (comprising a saw blade and rasp, the tip being broken) and a propeller-shaped bone artefact of unknown function (Pl. 2/1). All these artefacts could have been used in pharmaceutical or medicinal practice, but also they could be used for working leather (knives), textiles (the shears), bone or antler (saw) or metal (the whetstone). This is a classic case of the ambiguous nature of grave contents.

The inventory of the N–S oriented inhumation grave from St. Georgen/Traisen was associated with a 1.75 m-tall mature male and consisted of a pair of tongs, a file and the symmetrical head of a hammer, indicating a blacksmith. A pair of shears was found separately from the large tools (Pl. 2/2).

In the burial 37/2004 of a 35 to 45 year-old female oriented S–N from Oberndorf/Ebene (Ramsl *forthcoming*) two or three bone- or antler-made artefacts were recovered, found at the feet of the skeleton (Pl. 2/3). One is an antler tine with a groove at one end. Another is shaped like a quiver and is also made of antler. There is a comparable artefact from Dürrnberg–*Nordgruppe*, grave no. 322, similar to the Pottenbrunn 520 grave, interpreted initially, because of many other peculiar artefacts, as being associated with a druid or priest (Zeller 2003, 538–542). The tools from Oberndorf could have been used amongst other uses for unravelling knots which makes it possible to postulate that we are dealing with the transporting of goods on horse-back which required cordage to secure them on the pack-animal. Another reading is that it is a tool for embossing metal.

In the area around the Leitha Hills, the cemetery of Au am Leithaberge–*Kleine Hutweide* (Pl. 3/1) consists of at least two graveyards with 28 graves, some of them surrounded by square-shaped stone enclosures (Ramsl 2012b, fig. 3). In cremation grave no. 13 oriented SE–NW, next to a sniffle bit were found an iron ring, shears, two chisels, one asymmetrical hammer-head and one iron artefact, which had possibly been used as an anvil or die (Pl 3/2). Together with the other iron artefacts – two swords with scabbards and a knife bound by an iron ring – the inventory indicates the depot of scrap material from a smith's workshop.

In the large cemetery with 96 graves from Mannersdorf am Leithagebirge–*Reinthal Süd* (Ramsl 2010; 2011), the rich inventory in grave no. 22 of a 19 to 25 years-old woman marked probably one of the highest social members of the community (Ramsl 2011, 245–247). As in similar burials, a small group of objects was placed between the right hip and the right hand (Pl. 3/3). In this grave two fragments of iron bracelets, one small bronze ring and several small bronze fragments with grooves were placed together.

1 The pendant is silver plated and not solid silver as cited by Megaw *et al.* 1987.

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All-in-all, this combination of artefacts does not look like an extra set of bracelets, a belt or a necklace, but as a collection of scrap, especially the bronze fragments with rims seem to be weights or units of measure. So here, with some caution it can be postulated that this inventory demonstrates the access of the individual or of the *familia* to a range of resources.

Besides the interpretation of grave inventories, settlement features also can indicate the presence of craftsmen and craftsmanship. This is the case with potters whose presence is documented not only by their final products, but also by their workshops. Since the publication of a thesis dealing with this topic (Zeiler 2010) the number of La Tène period pottery kilns in Eastern Austria have increased largely as the result of the large rescue excavations in advance of highway- and railway-construction. At present 22 sites with La Tène kilns are known in Eastern Austria, their distribution demonstrating the current state of research rather than the original spread of workshops and their products (Fig. 3).

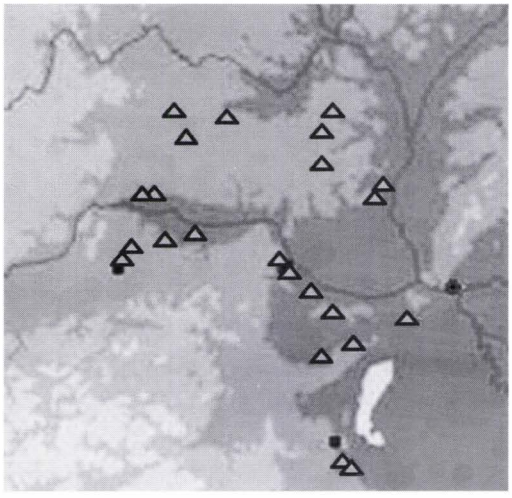

Fig. 3. Distribution map of pottery kilns in NE Austria.

In some cases these kilns were in pairs as at Göttlesbrunn (Karl 1996, 115), with typical plastered flue plate, while at other times, as that from Passauerhof (Krenn *et al.* 2010) or Michelstetten (Trebsche 2010, Plan 15–16), they are single structures (Pl. 4).

Next to the production centres, the distribution areas of pottery decoration are an indication of possible workshops. Thus, certain stamps like the comma-leaf motif which include the sites of Neunkirchen, Mannersdorf/Lgb., Sopron–*Krautacker* and Pottenbrunn have a distribution with a radius of about 100 km (Zeiler *et al.* 2010), while S-shaped motifs and hook meanders have a distribution of about 60 km.

In some cases on the base of pots signs or makers' marks can be seen. It is the case of pots from Mannersdorf graves no. 87 and 117, where rectangles with hatched diagonals have been incised on the base of the vessel. Analogous signs – only stamped into the clay, not engraved (Pl. 5/1) – can be seen at Sopron–*Krautacker* (Jerem 1984, fig. 4/6–8; Zeiler 2009, Taf. 145–146; 180; 193), Svätý Peter (Dušek 1960, Tab. I/7) and Třebusice (Waldhauser 2001, 490). The so-called *Bodenzeichen* can also be found on early La Tène wares, as well as on graphitic pots from the middle and late La Tène period (Čižmář–Meduna 1985; Čižmář 1995).

Regarding the genuine ornamentation techniques of the region it can be noticed, that the Traisen Valley and neighbouring areas are rich in artefacts which are decorated with ornaments constructed with a compass (Ramsl 2002, Abb. 117), done on different materials. These are found on bone and antler objects or bronze, iron artefacts, but also on pottery.

Concerning pottery, first to be mentioned comes from Oberndorf/Ebene, grave 9/1982 (Fnr. 16) where the ornament appears on a small wheel-thrown bowl with a prominent omphalos. Around the omphalos on the inside of the bowl two concentric circles can be seen. The concentric circles are bordered on the outside by a row of intersecting semi-circles (Pl. 5/2). Analogies can be mentioned from the settlement of Inzersdorf-Walpersdorf (Ramsl 1998, Abb. 25). In both cases the compass point is still visible (Pl. 5/3).

An example of a combination of circle ornamentation and stamps can be seen on the pot from Pottenbrunn grave no. 1/1930 (Ramsl 2002, Taf. 22). Here a sophisticated circle construction (Pl. 5/4) can be reconstructed (Ramsl 2002, Abb. 118).

The *Linsenflasche* in grave no. 82 from Gemeinlebarn–*Schneiderweg* (Neugebauer 1994, Abb. 9) was discovered together with a *Maskenfibel*, a spearhead, fragments of a sword and other pots. The shoulder of the *Linsenflasche* is decorated with a frieze of compass-ornaments comprising semi-circles, circles and split palmettes (Pl. 5/5). As a close analogy one may cite the *Linsenflasche* from Gars am Kamp (Pl. 5/6) north of the Danube about 35 km from Gemeinlebarn as the crow flies. The similarity of the friezes and the construction of the ornaments supports the proposition that there was a workshop producing these wares in the Traisen Valley.

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Tools used by potters for ornamentation are rare finds throughout the whole area of the La Tène culture. It is probable that a special type of compass having a simple shape – a *Stangenzirkel* – was used, which consists of a small piece of wooden board and two metal points. In this case it is highly improbable that such an artefact could have survived.

As mentioned earlier, a similar pattern can be also found on bone and antler artefacts. An example from the region is the turned handle found in Inzersdorf-Walpersdorf (Ramsl 1998, Abb. 17), where some rows of simple circles are linked by floral elements (Pl. 5/7). Identic ornament can be seen on the bronze belt-hook from Ossarn (Engelhardt 1976, Abb. 9). Together with simple circles, yin-yang motives, triskels, S-shaped volutes and circular arcs drawn inside a circle the ornamentation made with the help of a compass can be also found on several decorative scabbards (Pl. 5/8).

In 1977, in Sommerein am Leithagebirge, a pair of shoe lasts (Pl. 5/9) made of fired clay was found (Neugebauer 1981a). Due to their shape, it is clear that these were used for producing so-called *Schnabelschuhe* or pointed shoes. Based on the pottery found nearby, they can be dated as far back as the Early Iron Age. In the Late Hallstatt period and especially in early La Tène the *Schnabelschuhe* had become very *à la mode* in the areas around the Alps. Plenty of depictions as well as representations of the *Schnabelschuhe* are known, like the shoe-shaped fibula from Leopoldau in Vienna (Neugebauer 1992, Abb. 28/2), or that from grave no. 327 on the Dürrnberg (Tiefengraber–Wiltschke-Schrotta 2012, 261/27). It can be seen on the scabbard found in grave no. 994 from Hallstatt (Egg–Schönfelder 2009, Abb. 2), while a shoe-shaped vessel can be mentioned from grave no. 4 from Mannersdorf (Ramsl 2011, Taf. 36). The original model of this kind of shoe is supposed to be south of the Alps in 'Etruscan' areas (Schönfelder 1999, Abb. 6). Other evidence for shoes in the area are the bronze buttons like the ones from Oberndorf (Ramsl *forthcoming*), Gemeinlebarn (Neugebauer 1994, 308) or Herzogenburg–*Kalkofen* (Neugebauer 1981b, Taf. 18). The great number of finds reproducing shoes in different forms can be considered indirect evidence of shoemakers in the region.

Related craftsmanship can also be seen in nearby located settlement centres. In this case, based on the similarity of some production details, the Traisen Valley and the area of Bratislava show close connections. In this respect the belt-hooks from Stupava and Ossarn should be mentioned (Pl. 5/10). Both pieces show special moulded ornaments of the metal sheet. Also the butts of the spearheads from Stupava and Inzersdorf (Neugebauer 1996, Taf. 17/4, 6) show similar moulded ornamentation. This may be evidence of connections between craftsmen in the two regions.

Another example of connections of craftsmen over considerable distance, is the distribution of 'Mickey Mouse', or more soberly, 'sphinx-with-ears' fibulae (Pl. 5/11). Starting with the well-known piece found in grave no. 17 in Ossarn (Megaw *et al.* 1989, 500–506, Abb. 11–13) in the Traisen Valley, we can see a complete new focus in the area around Bratislava (Čambal 2012, Abb. 6). At the site of Horné Orešany at the eastern border of the Little Carpathians, a new centre from the Early La Tène period has been located (Pieta 2007; Megaw 2012). One of the new finds at this site is a 'sphinx-with-ears' fibula which is characterized by the typical cap with ears at the head and the bird-tail end (Pieta 2010, F. 1/2). Another anthropomorphic fibula from this site (Pieta 2010, F. 1/4) with a cap and distinct eyebrows can be seen as a related piece. Another example – about 200 km from Ossarn and 315 km from Horné Orešany – is the fibula from the Dürrnberg, grave no. 150 (Moserfeld-Osthang), which shows exact the same design of the head (Tiefengraber–Wiltschke-Schrotta 2012, Fototaf. 3/G 150/7).

In conclusion, one can observe that in the La Tène period Eastern Austria was an important production centre having connections with craftsmen over a wide area, and with workshops similar to the other regions inhabited by Celts, but also with genuine individual aspects manifested in the ornamentation of artefacts made of different raw materials.

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List of figures

Fig. 1. The grave goods triangle.
Fig. 2. Map of archaeological sites in Eastern Austria and the surrounding area mentioned in the text.
Fig. 3. Distribution map of pottery kilns in NE Austria.

List of plates

Pl. 1. 1. Grave no. 48 from Pottenbrunn (drawing: A. Gattringer, M. Imam); 2. Grave no. 54 from Pottenbrunn (drawing: A. Gattringer, L. Leitner; photo: A. Schumacher).
Pl. 2. 1. Grave no. 520 from Pottenbrunn (drawing: A. Gattringer, photo: F. Gotschim, BDA); 2. Grave of a smith from St. Georgen (photo: P. Trebsche, NLM); 3. Tools in grave no. 37 from Oberndorf/Traisen (drawing: M. Vignoli).
Pl. 3. 1. Map of the cemetery from Au/Leithaberge–*Kleine Hutweide*; 2. Tools from grave no. 13 in Au/L.–*Kleine Hutweide* (photo: H. Herdits, BLM); 3. Grave no. 22 from Mannersdorf–*Reinthal Süd* (drawing: M. Imam).
Pl. 4. Pottery kilns. 1. Göttlesbrunn (drawing: R. Karl); 2. Passauerhof (photo: BDA/AS-Archäologie Service, Gottfried Artner).

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Pl. 5. 1. Pottery base stamps (a. Mannersdorf, b. Sopron–*Krautacker*, c. Svätý Peter, d. Třebusice, e. Apahida (after JEREM 1984; DUŠEK 1960; SANKOT 1995; ZIRRA 1976); 2. Compass ornamentation on bowl 9/16 from Oberndorf 1982 (drawing: M. Vignoli); 3. Detail of puncture of a compass in ceramics (photo: A. Schumacher); 4. Compass ornamentation on a ceramic vessel from Pottenbrunn 1/1930; 5. Linsenflasche from Gemeinlebarn–*Schneiderweg*, grave 82 (drawing: M. Imam); 6. Linsenflasche from Gars-Thunau (drawing: Archiv IUFG, M. Negrete Martínez); 7. Compass ornamentation on a handle from Inzersdorf-Walpersdorf (photo: A. Schumacher); 8. Compass ornamentations on chape-ends from Pottenbrunn (drawing: M. Imam; P. C. Ramsl); 9. One of the two clay shoe lasts from Sommerein, Lower Austria (photo: P.C. Ramsl); 10. Details of the belt-hooks from Stupava and Ossarn (drawing: after ČAMBAL 2012; W. Leitner); 11. 'Sphinx-with-ears' fibulae from Ossarn, Horné Orešany and Dürrnberg (photos: A. Schumacher, Archiv SAV Nitra, Keltenmuseum Hallein, R. Poschacher).

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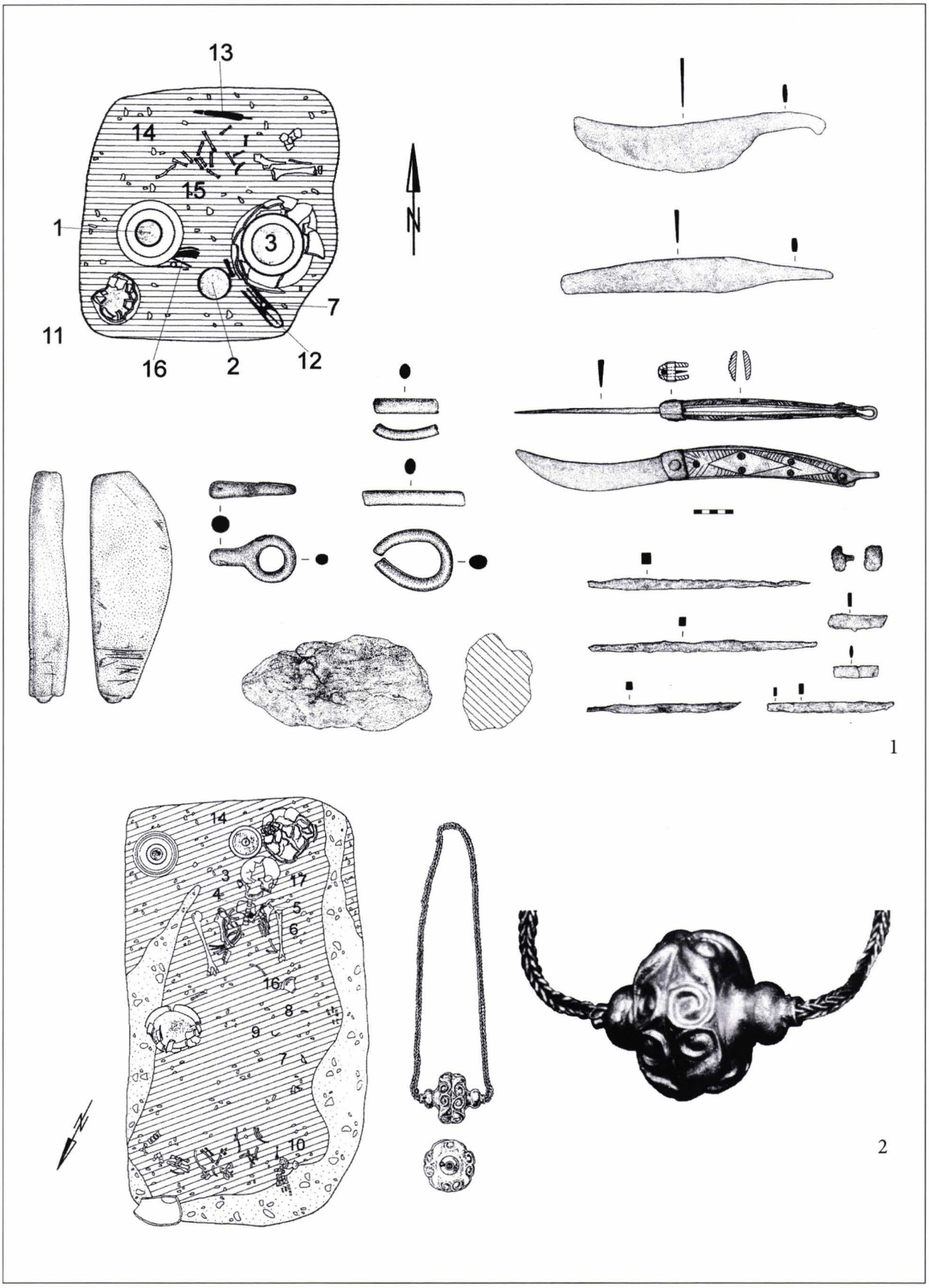

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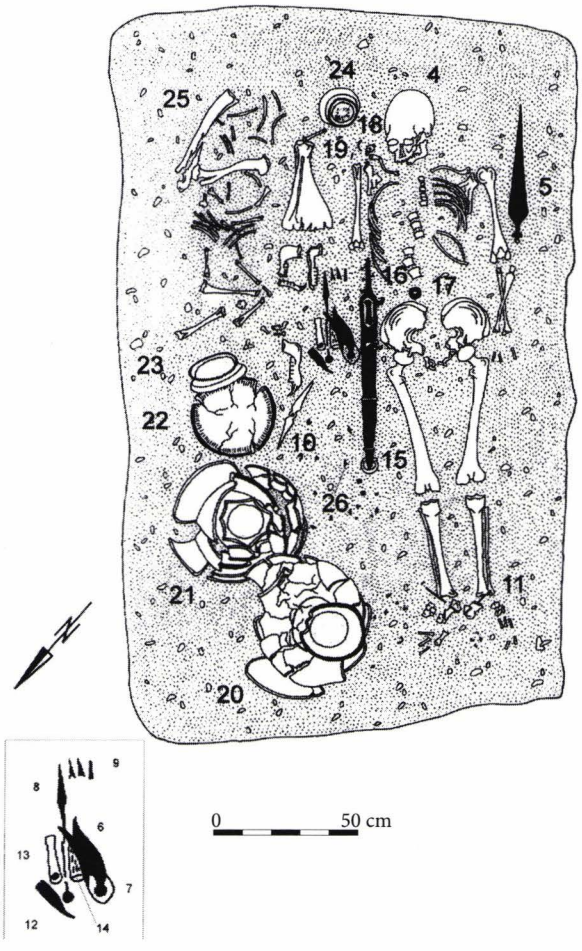

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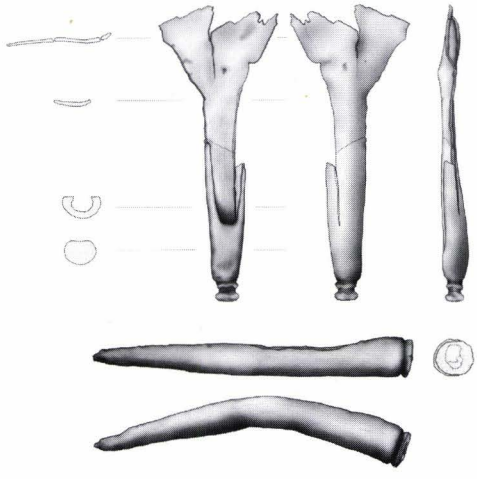

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Plate 2. 1. Grave no. 520 from Pottenbrunn (drawing: A. Gattringer, photo: F. Gotschim, BDA);
2. Grave of a smith from St. Georgen (photo: P. Trebsche, NLM);
3. Tools in grave no. 37 from Oberndorf/Traisen (drawing: M. Vignoli).

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Plate 3. 1. Map of the cemetery from Au/Leithaberge–Kleine Hutweide;
2. Tools from grave no. 13 in Au/L.–Kleine Hutweide (photo: H. Herdits, BLM);
3. Grave no. 22 from Mannersdorf–Reinthal Süd (drawing: M. Imam).

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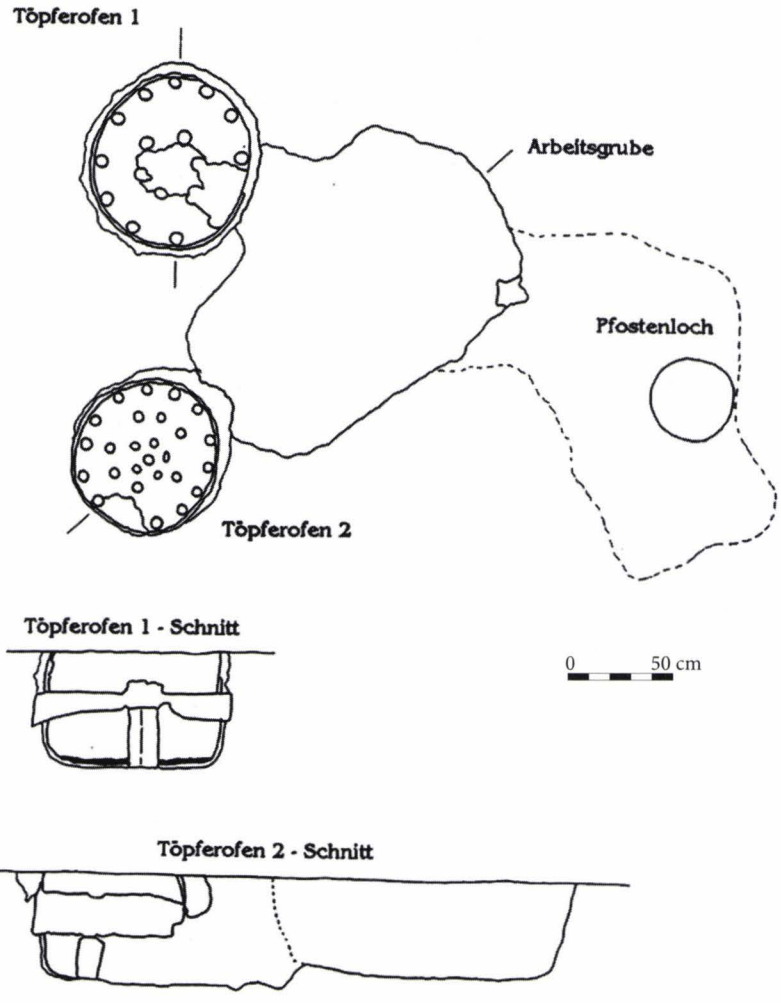

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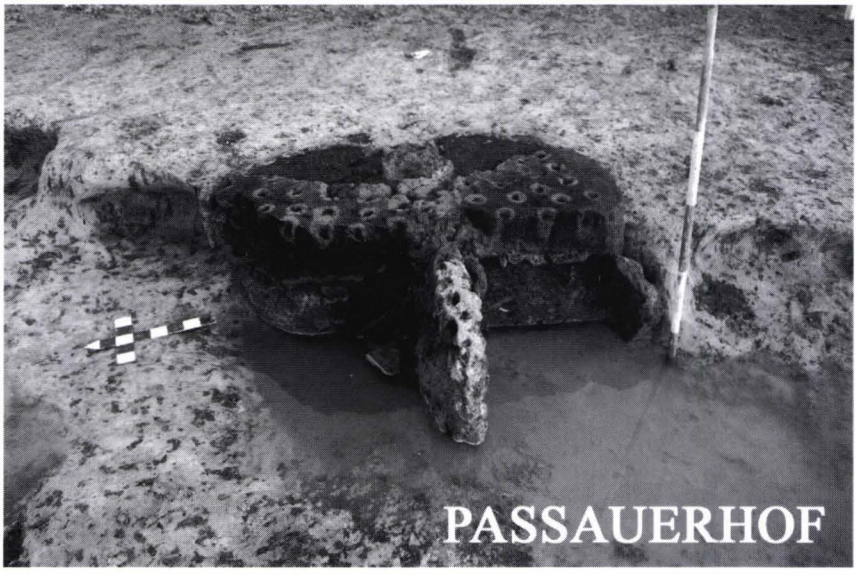

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Plate 4. Pottery kilns. 1. Göttlesbrunn (drawing: R. Karl);
2. Passauerhof (photo: BDA/AS-Archäologie Service, Gottfried Artner).

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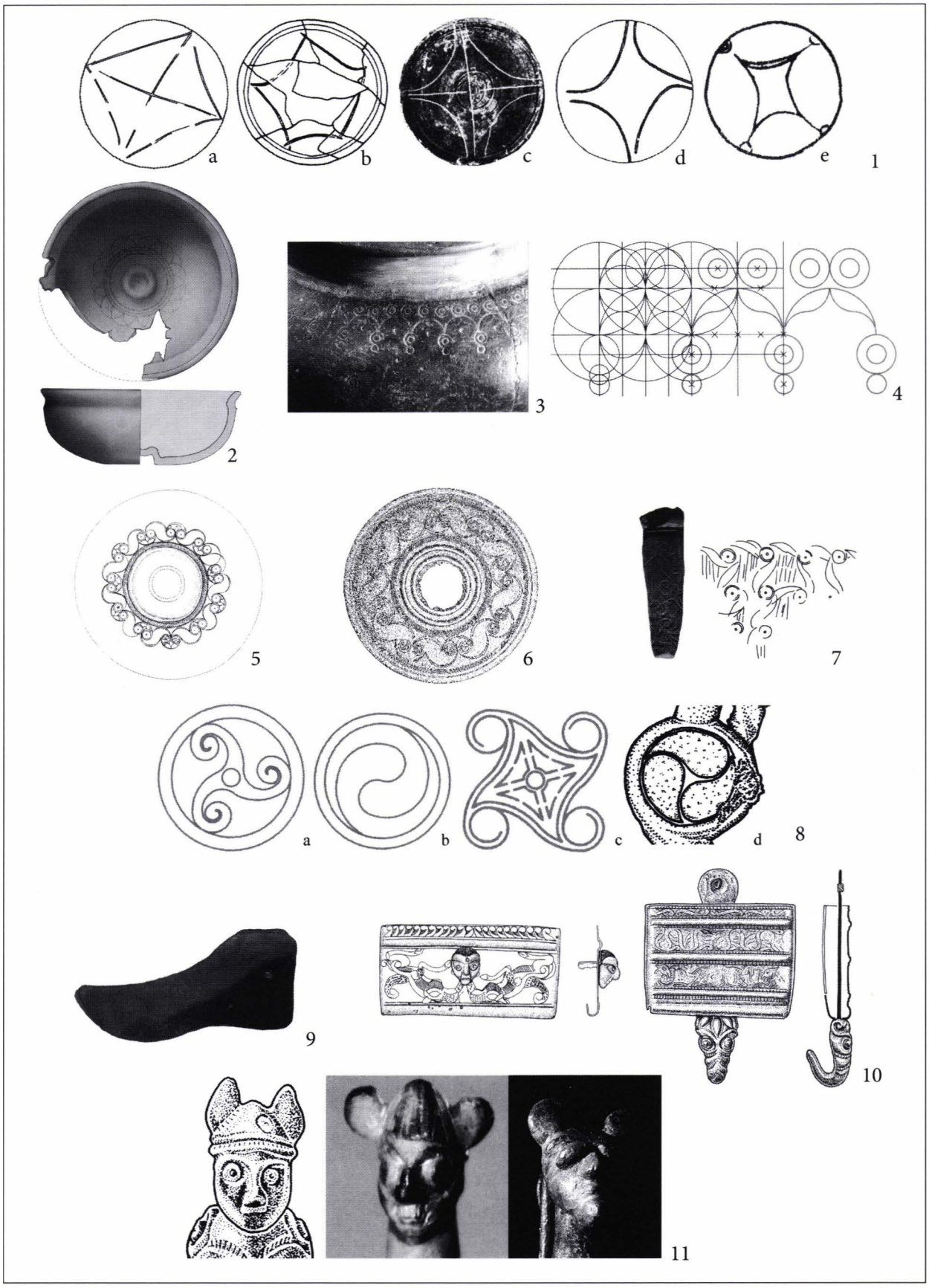

Plate 5. 1. a. Mannersdorf, b. Sopron–Krautacker, c. Svätý Peter, d. Třebusice, e. Apahida;
2. Oberndorf; 3. Detail of puncture of a compass in ceramics; 4. Pottenbrunn 1/1930;
5. Gemeinlebarn–Schneiderweg; 6. Gars-Thunau; 7. Inzersdorf-Walpersdorf;
8. Pottenbrunn; 9. Sommerein; 10. Stupava and Ossarn; 11. Ossarn, Horné Orešany and Dürrnberg.

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pXRF Analysis of South Pannonian Late Iron Age Silver Artefacts

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Keywords: pXRF, chemical composition, silver, jewellery, attire, workshops, south-Pannonia, Late Iron Age

Although rare finds of silver artefacts in the south of the Carpathian Basin and Western Balkans have been attested prior to the first millennium BC, frequent use of this prestigious material for dress adornment and jewellery commences during the Early Iron Age. It is presumed that most of the objects were crafted in local workshops, but from the late sixth century BC onwards trade interactions were also taking place, mostly with Greece and the Central Balkans as attested by several objects from Atenica and the Novi Pazar burial mounds in western Serbia (Vasić 1987b, 644–650). From the fifth to fourth centuries BC these contacts intensified as is manifested by numerous hinged fibulae, earrings and other objects of finery retrieved from south-east Pannonia (Vasić 1987a, 555–558).

Communnities with predominantly La Tène material culture, often referred to in the literature as the Eastern Celts, continued to use silver in the Late Iron Age of this region as well, although certain elements of the autochthonous Pannonian culture persisted. Several hoards which contained silver objects are known from this period, for example Kovin and Židovar in the Banat region, and Hrtkovci in Syrmia while some other silver objects formed parts of grave assemblages or have occurred as accidental finds (Brunšmid 1902, 83, fig. 42–44; Rašajski 1961; Todorović 1972, 34, T. XXXII, grave 110; Dautova Ruševljan– Jevtić 2006; Jevtić *et al.* 2006). A certain degree of influence was also coming from Dacian and Thracian territories which consequently resulted in the development of a heterogeneous material culture marked by the amalgamation of various metallurgical traditions. Typologically comparable objects of high aesthetic value can thus be traced over a vast area, indicating the existence of a supra-regional preference in specific material.

As these artefacts were made of prestigious material requiring specific know-how and craftsmanship, we can suppose they were being produced in a small number of workshops which supplied a fairly large market. If we are to define and identify these specific workshops and/or production centres, the technological aspects of the objects must be taken into consideration along with typological and chronological analyses, as analytical methods have proven to be very useful. By publishing the comparable data we wish to enrich the existing dataset presented by our Serbian colleagues and in this way contribute to the study of Late Iron Age metallurgy and toreutics in the Southern Carpathian Basin. Broader data sets collected across a wider geographical range offer a better insight into the metallurgical activities and

Iron Age Crafts and Craftsmen in the Carpathian Basin, 2014, p. 83–96

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traces of metallurgical traditions and trends present at the time, and also complement our understanding of the nature of these artefacts, as well as the social settings that have lead to their manufacture.

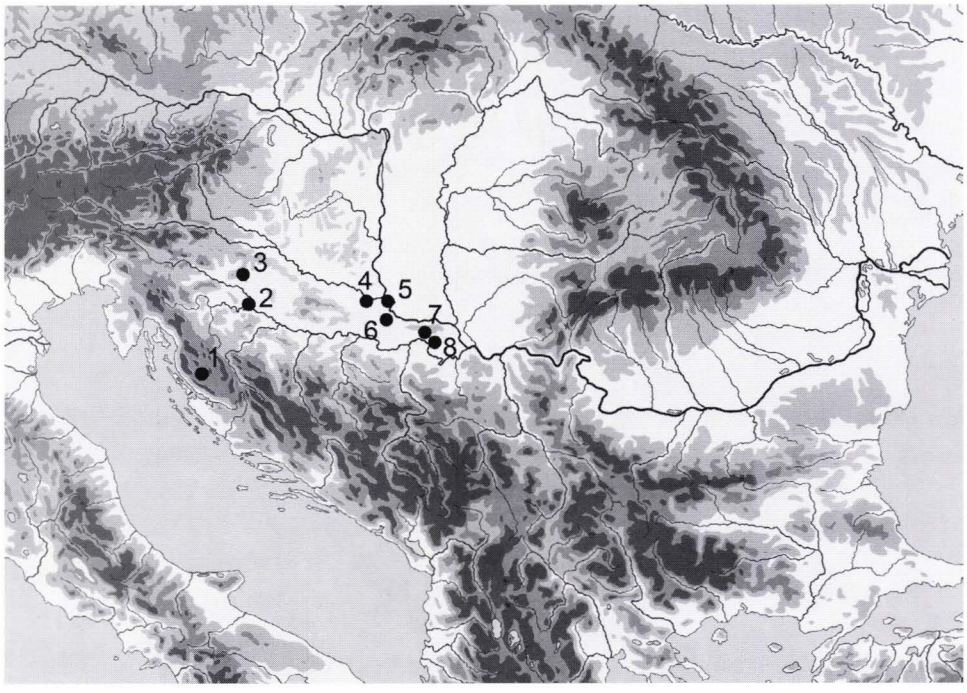

Fig. 1. The sites from which the analysed objects were retrieved. 1. Lički Ribnik; 2. Sisak; 3. Psarjevo; 4. Osijek; 5. Erdut; 6. Bogdanovci; 7. Sremska Mitrovica; 8. Jarak.

Fifteen Late Iron Age (third–first century BC) silver objects, retrieved from sites in the Southern Carpathian Basin and kept in the Archaeological Museum in Zagreb (Fig. 1), have been analysed for the purpose of this paper in order to gain an overview of the variety of possible metallurgical traditions, as well as to compare the new results with the existing analyses of similar material in the Židovar hoard. A few objects dated to the end of the Early Iron Age (fifth–fourth century BC) from Bogdanovci and Erdut have been included in the study as comparative material in order to trace the possible changes in the technological recipes over time (Pl. 2/5–6). Artefacts were produced using different techniques – casting, and cold- and hot-working – while the decoration was made by use of matrices, punching, gilding, filigree and granulation.

Two Jarak-type fibulae and a Laminci-type belt buckle (Pl. 1/1–3), retrieved from the eponymous site in Syrmia, were analysed. Along with a Pescate-type *simpulum*, these were an accidental find of 1902, and were procured for the National Museum's collection by J. Brunšmid. These objects thus do not have a firm archaeological context, although the presence of the Pescate-type *simpulum* more readily points to a grave unit – as was the case with grave 110 from the Karaburma cemetery (Brunšmid 1902, 83, fig. 42–44; Todorović 1972, 34, T. XXXII: grave 110, 1–7). Furthermore, the analysis included three objects from Sisak: a stylised anthropomorhic pendant manufactured using matrices (Pl. 1/6); a Middle La Tène fibula (Pl. 1/4); and a chain with a pendant in the shape of a female head (Pl. 1/5) ascribed to the Liburnian material culture (Tonc 2012). Further items included two fragments of silver sheet pendants from Sremska Mitrovica (Pl. 2/2); a fragmentary circular pendant from the Lički Ribnik hoard (Pl. 2/1) which included jewellery and coins and was most probably buried at the beginning of the first century AD; a loop-in-loop type necklace from Psarjevo (Pl. 1/7); a fragmented cylindrical box and two bracelets with stylized snake head endings from Bogdanovci (Pl. 1/8), probably from a grave which also contained early La Tène fibulae of Karaburma 63 type of a somewhat later date (Brunšmid 1909) and, finally, two bracelets from Erdut and Osijek, decorated with filigree and granulation (Pl. 2/3–4). Unless otherwise noted, the items are accidental finds with undefined archaeological contexts.

The study of the objects conveniently took place at the Archaeological Museum in Zagreb. Qualitative chemical analysis of the objects was carried out using the UCL Institute of Archaeology's portable X-ray fluorescence spectrometer (pXRF). The instrument used was Innov-X Systems model

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Delta Premium 4000, fitted with a gold tube and a SiPIN detector with a resolution of approximately 156 eV. X-ray fluorescence is a non-destructive method which analyses the surface composition of artefacts up to 200 μm in depth. The samples are bombarded with high-energy X-rays, causing the excited inner shell electron to be ejected from the atom. As a consequence, the outer, higher-energy shell electron fills its gap. During this alteration, a fluorescent X-ray characteristic of the element in question is generated (Tite 1972, 267).

The analyses were conducted with one beam at 40 kV, 30.5 mA, for a 20 seconds live-time count in the Alloy Plus setup. Three measurements were taken for each point of analysis, and the averages were calculated. Different areas of the same objects were analysed in order to investigate the homogeneity of the alloy and possible differences in the composition of the various construction parts. All of the results are reported normalised to 100 per cent weight up to one decimal place. The precision of the instrument was assessed by comparing the three measurements of the same point, and was found to be consistent. Standard deviations, coefficients of variation, and absolute and relative errors were calculated for all of the measurements. The coefficient of variation for silver is below 5%, and for the minor and trace elements below 20%, indicating a solid level of precision. The accuracy of the portable ED-XRF was assessed by analysing four certified reference bronze materials (App. 1); the average analytical values were then compared with the certified values of these reference materials, and plotted for a descriptive goodness of fit, which proved to be satisfactory (R^2=0.98–1).

Considering the irregular nature of the uncleaned analysed samples, the hand-held analyser's limits of detection for quantified elements are considered to be at best <1000 ppm (0.1wt%). A few other things should be kept in mind when looking at the data: the instrument is not calibrated for arsenic; the method itself analyses only the surface of the object; some elements (lead, tin, iron) might appear more abundant and others depleted on the surface of the object. Due to these limitations, the analysis is to be considered semi-quantitative.

As a reference point of comparison we consulted a forthcoming study of Živković *et al.* (2014) as it is, the only study so far analysing Late Iron Age silver objects commonly found in the Southern Carpathian Basin and Western Balkans. The authors present a pXRF analysis of silver objects from the Židovar hoard in South Banat excavated in 2004.

The authors' hypothesis about the Jarak-type fibulae is reinforced by the new data obtained in our study. As many as eight of these high silver content fibulae from the Židovar hoard were debased with copper and contained tin and lead in lesser percentages. Adding copper to silver was a standard recipe used in order to improve the hardness and toughness of the object, as pure silver is too malleable for the production of functional items. Furthermore, in low concentrations the copper does not affect the appearance (colour) of the object (Hughes–Hall 1979, 331). The presence of tin in the alloy is, however, surprising, leading Živković and her colleagues to conclude that high-tin bronze, instead of unalloyed copper, was added to the batch, thus indicating a distinct technological tradition specific to Scordiscan workshops (Živković 2011). The presence of tin in the composition is by no means accidental as the silver was obtained by cupellation of (most commonly) lead and copper ores, that is, separating the chemically less reactive noble metal from the base metals during smelting. Almost pure silver (99 wt%) could be obtained through this process, hence any base metal present in concentrations over 1wt% is a sign of its intentional addition to the alloy (Bailey 1995, 1; Bailey *et al.* 2008, 56; Hughes–Hall 1979, 332; Kassianidou 2003, 199; Živković *et al.* 2014, 160). Debasing silver with bronze can plausibly be interpreted as a distinct Scordiscan recipe, which possibly came about due to the neccessity of metal recycling, resulting from a hypothetical deficiency of raw material (copper ore) needed for the debasement. Further investigations of this hypothesis should be conducted.

These fibulae are dated to the late La Tène period (LT D1) and are typically Scordiscan in shape (Jevtić *et al.* 2006, 37–40, 94–104). Besides the fact they are made from silver, a prestigious material, in a few instances – namely in Jarak and grave 110 from Karaburma – these appear with Late-Republican Roman bronze vessels – specifically, Pescate-type ladles (*simpulae*) – which might be associated with the highest levels of the Scordiscan elite (Egri–Rustoiu 2008) and could thus be regarded as a marker of class identity.

The chemical composition of the alloy of the two Jarak-type fibulae (P-10471, P-10470, App. 2) from the eponymous site in Syrmia is remarkably similar to the ones from the Židovar hoard: silver is present

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in amounts over 90 wt% with the addition of copper (5–6 wt%) and tin (2.5–3 wt%). The lead is present in somewhat lower concentrations (below 1 wt%), as opposed to the 2 wt% (1.9), on average, contained by the Židovar samples. Low lead concentrations might be the aftermath of the cupellation process, or they might indicate lead was an impurity of the copper ore. A less likely explanation is that it might have been intentionally added to the bronze alloy. High amounts of iron were detected in the spring of one of the fibulae (P-10471); these are probably due to the iron rod used for its reinforcement, as also noted in the Židovar measurements (Živković *et al.* 2014, 163, table 5).

A similar alloy appears in the Laminci-type belt-buckle (P-10469, App. 2), found together with the Jarak fibulae (Brunšmid 1902, 85–86, fig. 45). This buckle is the only known example of this popular and widely spread Late Iron Age dress element which is made completely of silver (Drnić 2009; Guštin 2011, fig. 9). Typical examples include bronze sheet mounted on an iron backing plate, and there is a single example of silver sheet also mounted on an iron plate from the Slatinska Reka site (Jovanović *et al.* 1986, 378–379, 390, Sl. 3). The measurements of one of the decorated front rivets revealed high copper concentrations as expected considering the function of this construction part.

Slightly differing amounts of major elements in the two fibulae and the buckle indicate these were not made from the same batch of metal. The fact that their production appears to follow the same pattern supports the assumption that that the bronze used for debasing silver was a distinct type of a recipe. Another type of object with a similar chemical composition are the folding razors found in the Židovar hoard (Živković *et al.* 2014, 160–161).

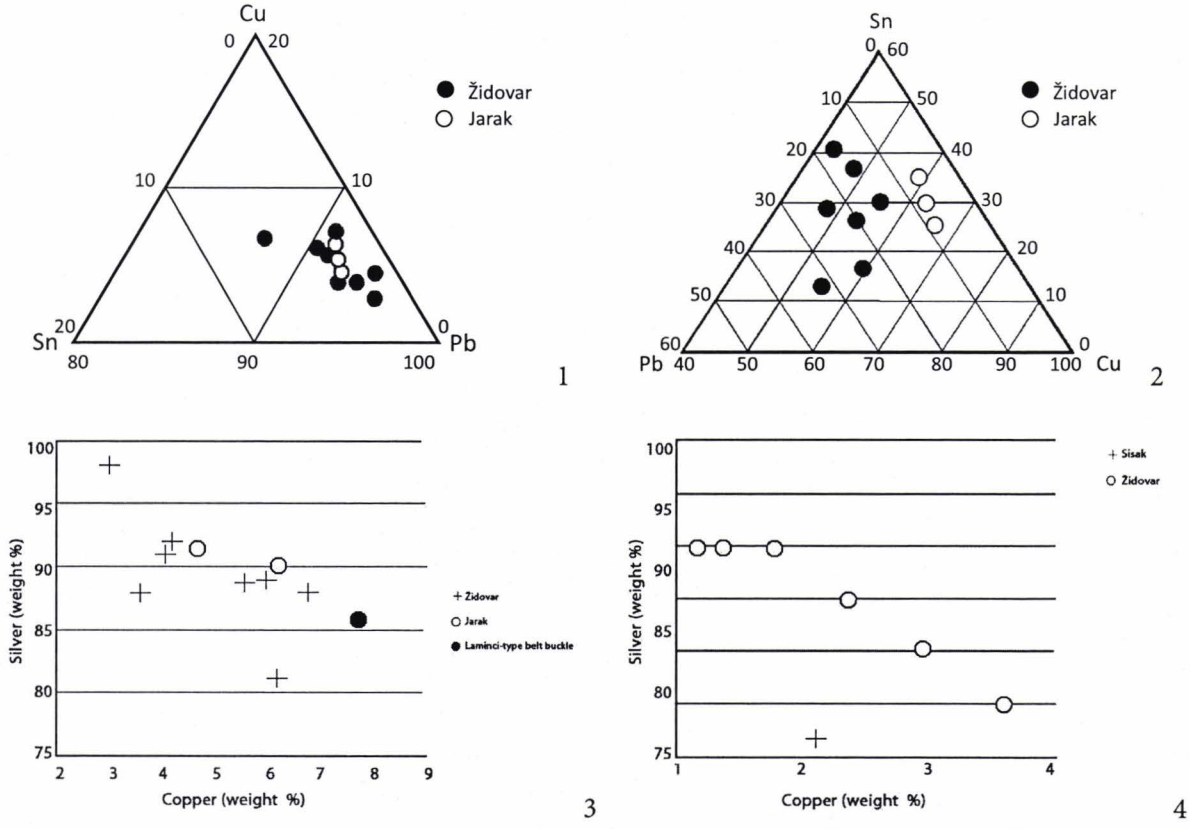

Fig. 2. 1. Ternary diagram showing silver-copper-tin ratio. Fibulae from Židovar and Jarak are very similar in their chemical composition; 2. Ternary diagram of copper-tin- lead in the Jarak-type fibulae. Note the lower lead percentage of the Jarak samples; 3. Scatterplot showing the silver-copper ratios in Jarak-type fibulae from Jarak and Židovar as well as the Laminci-type buckle; 4. Scatterplot of copper-silver ratios of anthropomorphic pendants from Sisak and Židovar.

On the other hand, some of the other silver items from the Židovar hoard contain lower copper percentages and no tin was detected. The first group of items is represented by sheet silver pendants, subdivided into six groups (Jevtić *et al.* 2006, 43–53, 138–153; Živković *et al.* 2014, 166). A similar object

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in the Archaeological Museum in Zagreb is an anthropomorphic pendant from Sisak (P-20641, App. 3) featuring a stylized full-body representation manufactured by the use of matrices. Four of these matrices, presumably tools for the production of the sheet silver pendants, were retrieved as accidental finds from the Kupa River at Sisak, which might indicate that Sisak could have been the production centre of these types of pendants which were distributed and used from the Eastern Adriatic and Transdanubia to Banat and northwest Bulgaria (Dautova Ruševljan–Jevtić 2006; Jevtić *et al.* 2006, 148–149; Tonc 2012).

The Sisak pendant's composition is 94 wt% silver and 2 wt% copper, similar to the Židovar pendants where average values ranged from 95 to 98 wt% for silver and 1.2 to 3.6 wt% for copper. It is interesting to note that zinc is present in low concentrations (0.3 wt%), which could indicate the copper ore used (Yang *et al.* 2009, 174). The same zinc levels are also present in the Sisak fibula (P-17193, App. 3) with hammered bow of triangular shape, wider spring with fifteen coils and an external cord, longer triangular catch plate and bent foot decorated with two discoid and spherical knobs. Tin has been detected in this fibula in amounts of 1.2 wt%.

The second group of items from the Židovar hoard made of silver-copper alloy are cylindrical filigree- and granulation-decorated boxes, identified by some authors as the products of Hellenistic workshops with some analogies in Macedonia (Jevtić *et al.* 2006, 63–64; Mitrevski 2011, 202, fig. 1; 3/9; 5). A similar but highly deteriorated box was found in Bogdanovci (P-20617, App. 3), a village located in the Croatian part of Syrmia, with five beads on its bottom and a remnant of the loop with which it was attached to a chain (Brunšmid 1909, 235, fig. 23/7). This object is composed of 96.3 wt% silver and 2.6 wt% copper, similar to the Židovar samples (97 wt% silver and 2.3 wt% copper for the sample with the attached chain and 95 wt% and 4.2 wt% for the sample without a chain). The similar compositions of these artefacts support the conclusion that these were indeed a product of a distinct, probably Hellenistic, workshop which used a different alloy recipe and materials than the ones used for the Jarak-type fibulae.

From a technological as well as an aesthetic point of view, possibly the most interesting item is the pendant in the shape of a female head from Sisak (P-17195, App. 3), embossed in sheet metal and attached to a plate with rivets, influenced by the Hellenistic tradition. It belongs to a set of artefacts with realistic female head representations, which have been defined as Liburnian in a recent typological analysis (Tonc 2012) and dated to the third–second century BC. The chain attached to the pendant consists of four segments connected with two bigger and one smaller loop. All of the various construction parts have been analysed: the chain has 97.9 wt% silver and one of the loops contains a high percentage of copper (39.2 wt%), probably due to its utilitarian function. The plate was manufactured from 'standard' silver copper alloy with somewhat higher concentrations of copper (9.4 wt%), while the sheet metal used for the female head has up to 12.5 wt% gold, resulting in a subtle coloristic effect in contrast to the greyish-silver background. Different chemical compositions of various construction parts testify to the object's complex and sophisticated production sequence divided into several production stages.

The use of gold was also noted in a few pendants from the famous Lički Ribnik hoard which also contained Late La Tène fibulae and a substantial quantity of Roman Republican coins which date the hoard to the beginning of the first century AD – probably to the period of the Great Pannonian Revolt (Klemenc 1935; Bilić 2012, 118–120, 135–136). Unfortunately, we were not able to analyse all of the hoard's items but only one deteriorated circular stamped sheet pendant (P- 16912, App. 3). Its decoration is elaborate: the concentric circles in the centre are brimmed by a series of point-shaped protrusions, as well as eleven circle shapes with a point in the middle, while the edge is decorated with a series of radially positioned ribs. The visible gold gilding was confirmed by the analysis. The front of the pendant measured 43.7 wt% gold, while at the back the amounts measured were 94.6 wt% silver, 2.8 wt% copper, and 2.3 wt% gold. The Ribnik hoard pendant was certainly gilded, but we are unable to confirm the same about the female head-shaped pendant from Sisak; it might have been gilded, but it is also possible that gold was an element in the alloy. Further unfortunately destructive analysis would be needed to determine this.

The two pieces of silver sheet decorated with impression matrices from Sremska Mitrovica (P-21125a, P-21125b, App. 3) are probably also fragments of similar pendants. A bigger piece, with a round central part bordered with lines placed at an angle, and with the closest analogy in one of the pendants from Lički Ribnik hoard, contains 96.8 wt% silver and 2.2 wt% copper. The front side of the smaller piece

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decorated with embossed knobs and circles with points in the middle, also found in the Lički Ribnik items, is gilded with 33.1 wt% gold. So far this is the only known example of gilded silver sheet in south-eastern Pannonia, the territory controlled by the Scordisci. Samples from Sisak and Lički Ribnik confirm that this technique was used in south-western Pannonia and Liburnean-Iapodean territory.

Two exquisite finds – bracelets from Osijek (P-21087, App. 2) and Erdut (P-21157, App. 2), decorated with filigree and granulation, along with the above mentioned cylindrical boxes – demonstrate the existence of contact with the southern workshops, probably Macedonian. Relatively scarce items decorated in this technique are known from the Carpathian Basin, for example the Szarad–Regöly hoard (Szabó 1975; 1992, 162–170). The Osijek and Erdut bracelets have an interesting shape: a thin hammered band which turns into several smaller twisted segments, and a cylindrically wound edge. Filigree and granulation decoration is found on the flat part of the band; a simpler decoration is present on the Erdut sample (a bead and a tendril), whereas the decoration on the Osijek bracelet is more complicated, with conical protrusions and closely spaced granulation. The bracelets consist of an average 96 wt% of silver and 2 wt% copper. Another example of a similar bracelet with three conical protrusions is known from the La Tène cemetery in Donji grad in Osijek (Spajić 1954, 13, T. IV:28; Szabó 1975, pl. 6/1–2). This cemetery was used from the Early until the end of Middle La Tène phase (Spajić 1954, 7–18; Spajić 1956, 47–55; Spajić 1962, 37–70), which might indicate that this type of bracelet is somewhat older than the objects from Židovar hoard. Szabó supposes that certain items – decorated, like the above mentioned bracelets, with somewhat simpler filigree and granulation – might have been produced in the south-eastern Pannonian workshops, which were influenced by the Hellenised production centres in the Balkans where these techniques were used at least from the late fifth to early fourth century BC (Szabó 1992, 169). Hence, the Scordisci were the link between the Hellenistic world in the south and Celtic regions in the north.

The last result presented is the analysis of the Psarjevo necklace (P- 10674, App. 2). This is an exquisite piece, consisting of twelve intertwined chains in loop-in-loop technique, and two stylised snake heads at the ends, which were produced from a silver sheet, and decorated with filigree and granulation. Glass pieces may have also been a part of the decoration, but these are missing from the necklace. Some authors have attributed this necklace to a first century BC Dacian workshop, following the analogy found in the Merri-Goala hoard in Transylvania (Majnarić–Pandžić 2008, 316–317). The chains of this necklace, as well as the sheet metal endings, are made of almost pure silver (98 wt%). Two chains made of intertwined wire and the cylindrical sheet metal endings from the Židovar hoard have a slightly lower percentage of silver (96 wt%), and higher amounts of copper and lead. It is interesting to note that the wire loops on the edge of the chains in one of Židovar samples are debased with high-tin bronze, noted above as the recipe for the Jarak-type fibulae and the Laminci-type buckle (Živković *et al.* 2014, 160), which could indicate potential recycling and reuse of material.

The purest silver (99 wt%, with copper amounts below 1 wt%) was used for the production of the Bogdanovci bracelets (P- 10675a, P- 10675b, App. 4) made of ribbed silver sheet-metal, with two stylized serpent heads at each end. Bracelets of this type are somewhat older than the items noted above: according to the chronology of the Late Iron Age Croatian and Serbian Danube regions devised by Božič (1981), they are to be dated to the fourth century BC, i.e. the Čurug phase.

Bracelets of this type were surely made in local workshops; they are characteristic for the late Hallstatt of south-eastern Pannonia, and represent part of the material culture of the Syrmian group (Vasić 1987a, 557). The chronological gap might explain the somewhat different alloy composition used in the south-eastern Pannonian workshops, but considering the limited number of samples examined, no firm conclusion can be reached until further studies take place. One analysis could be taken as supporting this hypothesis: the analysis of a boat-shaped earring from Erdut (P-7806, App. 4), decorated with filigree and granulation (Vinski 1950), generally dated between the fifth and fourth century BC, and composed of 98 wt% silver and 1.1 wt% copper. These items were common during this period in the Balkans and south-eastern Pannonia. The Erdut earrings, along with the electrum-made examples from Sremska Mitrovica, were products of southern Balkan workshops (Majnarić–Pandžić 1998, 48, Sl. 70).

What was the reason for the differences in copper quantities in the alloy recipes? Possibly the answer lies in the objects' functionality – earrings and bracelets need not be as hard as belt-buckles or fibulae. But, in all likelihood, it was a consequence of new metallurgical knowledge, new trade routes and the arrival of craftsmen with different metallurgical traditions to the area.

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Besides silver and copper, alloys used for the production of Jarak-type fibulae and folding razors from Židovar contained lower amounts of lead and tin, leading to the conclusion that this was a distinct alloy recipe used in the workshops of the Scordisci. This hypothesis has been confirmed by the newly obtained measurements of the two Jarak-type fibulae from the eponymous site, as well as the Laminci-type buckle discovered with these fibulae, both of which are very similar in composition to the Židovar hoard samples.

Higher copper percentages were noted in the Sisak fibula and in certain construction elements of some items such as the loop connecting the chains of the female head pendant, or the rivet on the Laminci-type buckle. Although tin was detected in the Sisak fibula, it was probably not a product of a Scordiscan workshop. However, the reason for the presence of tin in this sample and the possible relationships with the Jarak-type fibulae needs to be further investigated.

Most of the other objects contain high levels of silver and copper in amounts of up to 3 wt%. This is the case with the anthropomorphic silver sheet pendant from Sisak, the intertwined chain necklace from Psarjevo, the Osijek and Erdut bracelets, and the box decorated with filigree and granulation from Bogdanovci, the latter probably being a product of Macedonian workshops. The possibility of the filigree and granulation decorated items being produced in south-eastern Pannonian workshops, which is not yet archaeologically confirmed, should also be taken into account. The Psarjevo necklace is probably a product of Dacian workshops according to the known analogies (Majnarić–Pandžić 2008).

A technique that is not found in the Židovar samples is gilding. This is present in the Lički Ribnik hoard material, the fragment of the pendant from Sremska Mitrovica (which is probably an import from the Liburnian-Iapodean territory), and possibly the anthropomorphic pendant from Sisak, although in the latter case, the gold might be an element in the alloy. Conversely, the accidental finds of matrices in Sisak open up the possibility of local workshops that need to be looked at in more detail in further research.

In general, the wide geographical distribution of the analysed material bears testimony to the existence of cultural interactions in the Carpathian Basin and the Western Balkans, characterized by the preference for silver as a prestige material for jewellery and dress elaboration, with slight regional distinctions in types of adornment – for example, the Jarak-type fibulae, characteristic of the Scordisci, or the Liburnian anthropomorphic pendants, spread throughout the Eastern Adriatic and its hinterland. Some objects are found in an even wider area, such as silver sheet pendants or chains made of intertwined wire, confirming the existence of a communication network through which these objects, as well as the tendencies for their employment in dress elaboration, were transported between local Pannonian, western Balkan, Dacian and Hellenistic workshops.

Although this research is only at its beginning, several studies of silver objects carried out in the past decade, such as those on the Židovar hoard or the Hrtkovci find certainly present a good basis for further research into the metallurgical traditions and craftsmanship of the Late Iron Age in the Carpathian Basin. The results presented in this article are a modest contribution toward this aim, building on the analyses of the Židovar hoard samples and largely confirming the hypothesis made in this pioneering study. It is precisely through the broadening of compatible data sets and comparisons of the conducted analyses that the further progress is to be made in the study of Late Iron Age technology and metallurgical traditions in the Carpathian Basin.

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Appendix 1

Standard (*given*) and analysed (calculated *average*) values of the reference material. Standard deviations (*SD*), coefficients of variation (*CV*), and absolute (*δ absolute*) and relative (*δ relative*) errors both in the analysed and standard values indicate a satisfactory accuracy of the portable instrument.

	Fe	Ni	Cu	Zn	Sn	Sb	Pb	Bi
50.01-4								
AVERAGE	0.3	2.3	73.7	1.0	10.3	0.5	12.0	0.0
SD(s)	0.0	0.0	0.3	0.0	0.1	0.0	0.2	0.0
CV(%RSD)	3.7	1.3	0.5	2.5	1.4	6.4	1.7	0.0
Given	0.2	2.2	74.1	1.2	9.5	0.6	11.7	0.03
d absolute	0.0	0.0	−0.4	−0.2	0.8	−0.1	0.2	0.0
d relative	18.8	0.9	−0.6	−14.1	8.8	−9.4	1.8	−100.0
50.04-4								
AVERAGE	0.1	1.1	76.2	0.6	12.6	0.4	8.8	0.1
SD(s)	0.0	0.0	0.1	0.1	0.2	0.0	0.1	0.0
CV(%RSD)	9.8	1.1	0.2	15.9	1.2	2.2	0.6	2.4
Given	0.1	1.1	76.1	0.7	11.3	0.5	9.9	0.1
d absolute	0.0	0.0	0.1	−0.1	1.3	−0.1	−1.2	0.0
d relative	36.3	1.4	0.1	−8.9	11.9	−11.2	−11.8	13.7
42.23-2								
AVERAGE	0.3	0.2	74.3	22.0	2.0	0.4	0.8	0.0
SD(s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CV(%RSD)	1.4	3.8	0.0	0.2	1.9	2.5	2.0	87.4
Given	0.4	0.2	74.4	22.1	1.6	0.4	0.6	0.0
d absolute	0.0	0.1	−0.1	−0.1	0.4	0.0	0.2	0.0
d relative	−2.6	30.3	−0.1	−0.6	22.4	−0.4	36.7	−28.2
71.32-4								
AVERAGE	0.4	0.7	80.0	6.4	7.2	0.2	4.9	0.0
SD(s)	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0
CV(%RSD)	2.8	0.8	0.1	0.9	1.8	5.0	0.8	17.2
Given	0.4	0.7	80.5	6.4	6.5	0.0	4.4	0.1
d absolute	0.1	0.0	−0.4	0.0	0.7	0.2	0.5	0.0
d relative	16.3	4.3	−0.5	−0.3	11.0	0.0	11.2	−55.5

Appendix 2

The chemical composition of Jarak-type fiblulae, Laminci-type buckle, and Osijek and Erdut bracelets. All elements are given in weight %, and normalised to 100%.

	Fe	Ni	Cu	Zn	Ag	Sn	Au	Pb
P-10471								
spring	7.6	0.0	4.6	0.0	84.7	2.1	0.4	0.6
bow	0.0	0.0	6.8	0.0	89.6	2.3	0.3	0.8
foot	0.0	0.0	5.5	0.0	90.7	2.3	0.3	0.8
P-10470								
spring	0.2	0.0	2.6	0.0	93.9	2.8	0.3	0.2
bow	0.0	0.0	5.8	0.0	90.4	2.8	0.4	0.6
foot	0.0	0.0	3.7	0.0	92.5	2.8	0.4	0.5
P-10469								
central rib	0.0	0.0	7.8	0.1	83.5	4.0	0.3	4.3
front side	0.0	0.0	7.8	0.0	87.6	3.5	0.2	0.7
rivet	0.4	0.0	21.7	0.0	70.5	3.5	0.2	3.4

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P-10674								
ending – left	12.9	0.0	0.9	0.0	85.1	0.0	0.6	0.4
ending – right	0.0	0.0	1.2	0.0	97.9	0.0	0.6	0.2
chain	0.0	0.0	0.8	0.0	98.1	0.1	0.5	0.4
P-21087	0.7	0.0	2.3	2.3	96.2	0.0	0.6	0.1
P-21157	1.3	0.0	1.7	1.7	96.5	0.0	0.0	0.1

Appendix 3

The chemical composition of female head-shaped pendant, fibula and anthropomorphic pendant from Sisak, box from Bogdanovci, circular impressed-sheet pendant from Lički Ribnik, and silver sheet pendants from Sremska Mitrovica. All elements are given in weight %, and normalised to 100%.

	Fe	Ni	Cu	Zn	Ag	Sn	Au	Pb
P-17195								
chain	0.1	0.2	1.4	0.0	97.6	0.0	0.4	0.1
	0.3	0.0	0.5	0.1	98.2	0.0	0.0	0.2
ring	2.3	0.2	39.2	0.0	39.3	3.2	0.1	1.3
plate	0.2	0.4	9.4	0.1	87.0	0.4	1.2	0.5
head-right	0.1	0.0	3.9	0.0	83.2	0.0	12.5	0.3
head-left	0.1	0.0	2.5	0.0	84.7	0.0	12.4	0.2
P-17193								
spring	0.3	0.0	4.7	0.3	92.0	1.2	0.4	0.8
bow	0.2	0.0	3.9	0.3	94.3	0.0	0.4	0.8
P-20641	2.1	0.0	2.1	0.3	94.4	0.0	0.4	0.6
P-20617	0.0	0.0	2.6	0.0	96.3	0.0	0.6	0.4
P-16912								
front side	0.2	0.0	1.3	0.0	54.7	0.2	43.7	0.0
back side	0.0	0.0	2.8	0.0	94.6	0.0	2.3	0.2
P-21125a	0.0	0.0	2.2	0.1	96.8	0.0	0.4	0.5
P-21125b								
front side	0.3	0.0	3.0	0.0	64.4	0.4	31.3	0.0
back side	0.2	0.0	1.8	0.0	96.8	0.0	0.8	0.2

Appendix 4

The chemical composition of Bogdanovci bracelets, and Erdut boat-shaped earring. All elements are given in weight %, and normalised to 100%.

	Fe	Ni	Cu	Ag	Sn	Au	Pb
P-10675a	0.1	0.0	0.9	98.7	0.0	0.2	0.0
P-10675b	0.0	0.0	0.5	99.3	0.0	0.1	0.0
P-7806	0.2	1.1	1.1	98.0	0.0	0.0	0.6

Appendix 5

Cofficient of variation between elements in the buckle and the fibulae is too high to imply that the three items were produced from the same batch, further reinforcing the hypothesis that bronze was a standard addition to the alloy.

	Cu	Ag	Sn	Pb
SD (s)	1.5	3.1	0.7	1.1
CV (% RSD)	24.7	3.5	22.4	84.1

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List of figures

Fig. 1. The sites from which the analysed objects were retrieved. 1. Lički Ribnik; 2. Sisak; 3. Psarjevo; 4. Osijek; 5. Erdut; 6. Bogdanovci; 7. Sremska Mitrovica; 8. Jarak.

Fig. 2. 1. Ternary diagram showing silver-copper-tin ratio. Fibulae from Židovar and Jarak are very similar in their chemical composition; 2. Ternary diagram of copper-tin- lead in the Jarak-type fibulae. Note the lower lead percentage of the Jarak samples; 3. Scatterplot showing the silver-copper ratios in Jarak-type fibulae from Jarak and Židovar as well as the Laminci-type buckle; 4. Scatterplot of copper-silver ratios of anthropomorphic pendants from Sisak and Židovar.

List of plates

Pl. 1. 1–3. Jarak (acc. n. P-10471, P-10480, P-10469); 4–6. Sisak (acc. n. P-1793, P-17195, P-20641); 7. Psarjevo (acc. n. P-10674); 8. Bogdanovci (acc. n. P-20617).

Pl. 2. 1. Lički Ribnik (acc. n. P-16912); 2. Sremska Mitrovica (acc. n. P-21125); 3. Osijek (acc. n. P-21087); 4. Erdut (acc. n. P-21157); 5. Bogdanovci (acc. n. P-10675); 6. Erdut (acc. n. P-7806).

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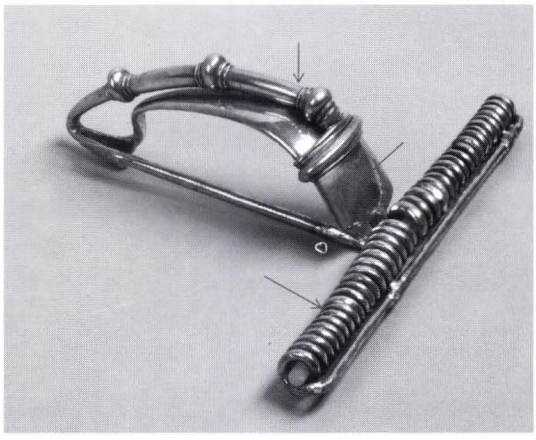
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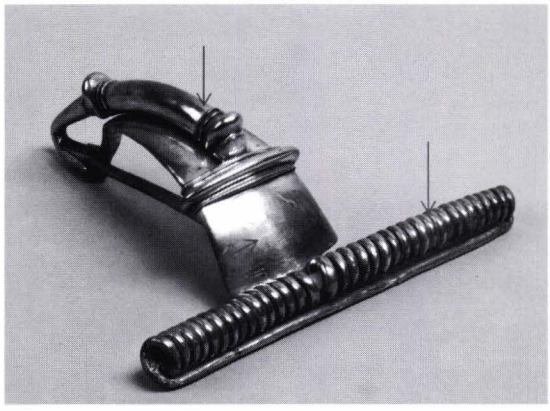
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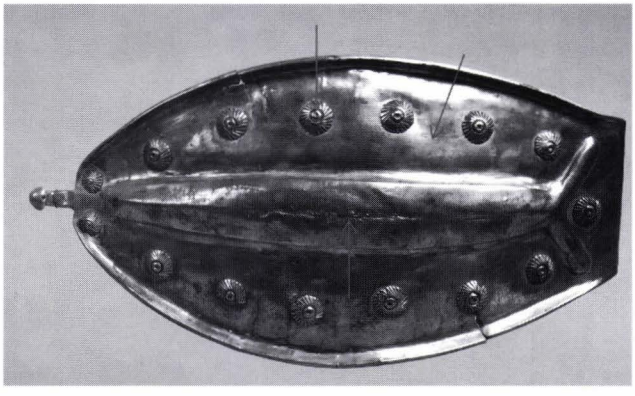
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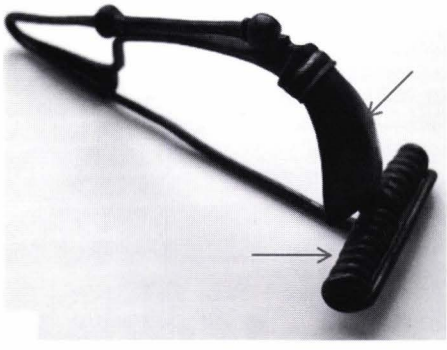
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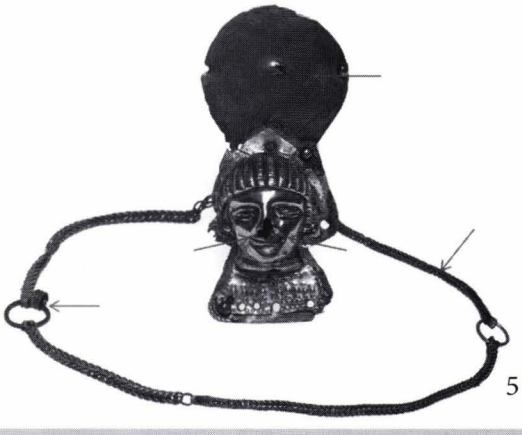
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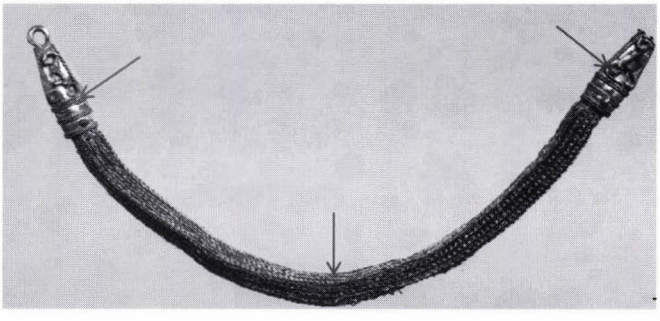
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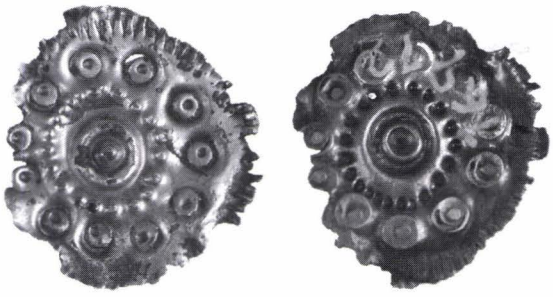

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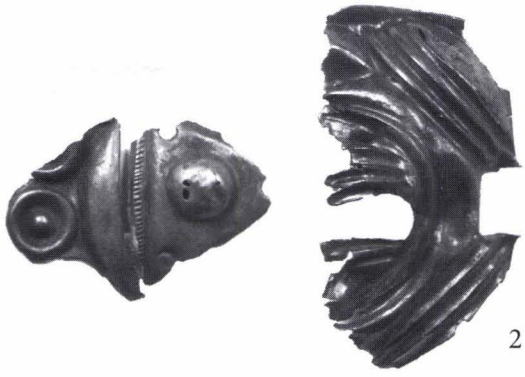

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Plate 2. 1. Lički Ribnik (acc. n. P-16912); 2. Sremska Mitrovica (acc. n. P-21125); 3. Osijek (acc. n. P-21087); 4. Erdut (acc. n. P- 21157); 5. Bogdanovci (acc. n. P-10675); 6. Erdut (acc. n. P-7806).

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Bronze Fibulae with Enamel Inlay from Scordiscan Sites

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Keywords: fibulae, enamel, Scordisci, south-eastern Pannonia, Middle La Tène, workshops

In the territory of the Scordisci in the south-eastern part of the Carpathian Basin, have been found bronze fibulae of Middle La Tène type which have variously shaped depressions filled with polychrome enamel on a rectangular plaque near the end of the long foot. These fibulae are considered a characteristic item of the costume of Scordiscan women. However, fibulae of this type have also been documented in the neighbouring areas and even at sites in the northern parts of the Carpathian Basin (Fig. 1), once again raising questions regarding their origin, distribution and dating.

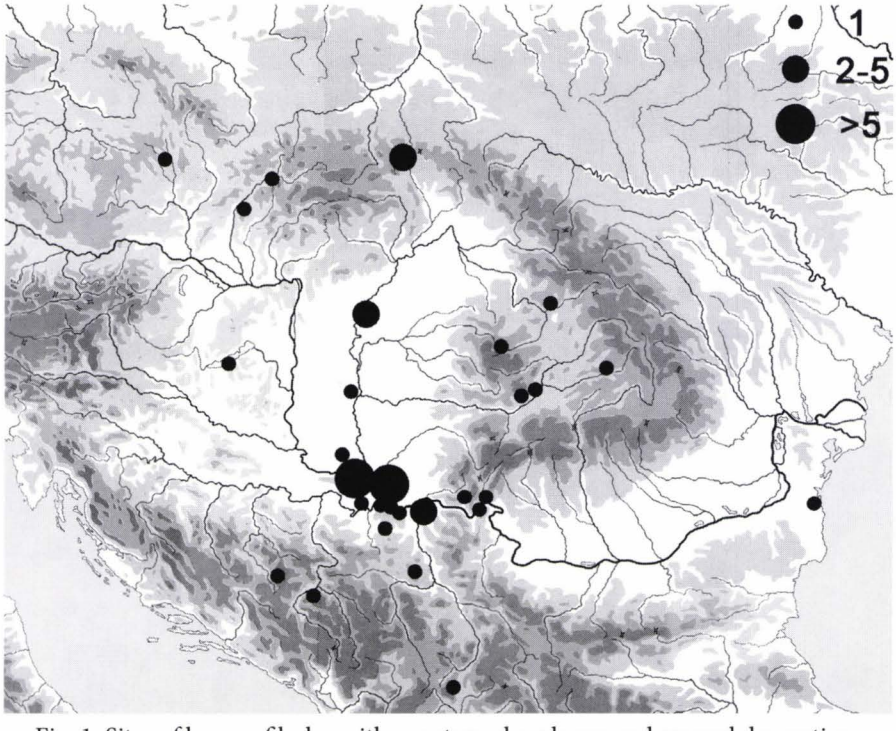

Fig. 1. Sites of bronze fibulae with a rectangular plaque and enamel decoration.

Although bronze fibulae characterised by enamel decoration were distinguished as a separate type from very early on, it was initially believed that they formed part of bronze belts decorated in the same way, sometimes even with the same motifs (Sellye 1939). The fibulae were subsequently analysed by I.

Iron Age Crafts and Craftsmen in the Carpathian Basin, 2014, p. 97–114

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Hunyady (1942, 81–82) who, like Sellye, dated them to the Late La Tène. A number of fibulae were then published by Todorović (1968; 1971; 1974; Tatić-Đurić 1970). In the opinion of Majnarić-Pandžić (1970, 15, 37), who described in detail the fibulae from Boljevci and Novi Banovci, they belonged to female attire dating to the transition from the Middle to Late La Tène, with the presumed continuity of use during the Late La Tène. Another advocate of the opinion that they were a characteristic form of the material heritage of the Scordisci was M. Guštin (1984, 330). Nevertheless, the most detailed analysis so far was published by P. Popović (2002), who characterised them as the Zemun type, in view of the many finds from the stretch of the Danube bank between Zemun and Novi Banovci. Within this assemblage he recognized certain finds that could be interpreted as wasters, which would indicate a local production of the Scordisci in eastern Syrmia. Likewise, he supposed that the Little Scordisci transferred the form further east into the area inhabited by the Daco-Getae (Popović 2002). Due to the lack of knowledge about closed finds, particularly from burials, Popović dated the fibulae to the second century and the beginning of the first century BC, while evidence of their production towards the end of the first century BC has been provided by a fibula found in the collective tomb at Gomolava (Popović 2002, 353–354).

In addition to the Scordiscan territory, bronze fibulae with a rectangular plaque decorated with enamel appear also at other sites in the Carpathian Basin (Fig. 1), from Hungary (Stanczik–Vaday 1971; Pilling–Újvári 2012) and Romania (Beldiman 1993; Rustoiu 1997; Teleagă 2008; Ferencz 2012), to sites in the northern part of the Carpathian Basin (Čizmář 2005; Pieta 2010). Bronze fibulae with a rectangular plaque from Romanian sites have been distinguished as type 5a and which generally have depressions in the shape of a rectangle or triangle (Beldiman 1993, 184–188, fig. 2; Rustoiu 1997, 39–40, 99, fig. 25; Ferencz 2012, 79–82, fig. 2). Most authors consider it as a Middle La Tène form from the second century BC (Rustoiu 1997, 38–39), comparing the finds from Slovakian and Moravian sites with those from the distribution area of the Scordisci and from Transylvania, due to which it is presumed that they may have arrived with the colonisation of the new population from southern Pannonia (Čizmář 2005, 133, fig. 2; Pieta 2010, 31–32, fig. 9).

When one discusses the beginning of the production and the origin of this characteristic type of female attire, it is important to compare them with iron fibulae that are also decorated with enamel. Iron fibulae with a small rectangular plaque set between two knobs on the foot, in the opinion of Teleagă (2008, 95, fig. 5/1), appear in LT C1 graves, for instance at the Curtuişeni cemetery. The latter fibula is analogous to the one with a rectangular, almost square, plaque from grave 60 of the Pişcolt cemetery, which has been distinguished as type A20 (Németi 1992, 70, 105, fig. 8). The LT C1 date is corroborated by the finds of fibulae in graves 186 and 741 at the Holiare cemetery in south-western Slovakia (Benadík 1957, fig. 28/3–6; pl. 32/12, 16), which are attributed to Bujna's BF-J group, dated to the end of LT C1 (Bujna 2003, 61, obr. 29). It is precisely these fibulae with a low bow and long foot on which plaques of various forms are set between knobs, which are considered as the prototypes for the other fibulae with enamelled plaques which are younger (LT C2–D1) and smaller, with a trapezoidal bow and a smaller triangular foot (Teleagă 2008, 95). Based on the finds from burials, bronze fibulae are dated to LT C1, lasting also during LT C2, with a presumed origin in the Tisza and Körös basins from where they later developed around the Danube and Sava and from where they eventually reached central Transylvania (Teleagă 2008, 95–96, fig. 6). The latest detailed analysis of bronze fibulae with enamel decoration, as part of the female attire bearing witness to the contacts established between the eastern Celts, was provided by Guštin (2011, 125–126, fig. 8), who distinguished a Middle La Tène variant with a rectangular plaque, and a Late La Tène one, which is additionally characterised by lateral protrusions on the central plaque. The latest list of sites that yielded fibulae decorated with enamel is found in the discussion that accompanies the analysis of the fibula from Ardeu (Ferencz 2012).

The distribution of the so far known finds of bronze fibulae with rectangular plaques decorated with enamel probably points to the existence of several workshops in the Carpathian Basin, leaving open the question of their detailed typological classification which in turn perhaps points to the position of the workshops in which they were produced (Fig. 1). Likewise, through a detailed typological classification we might put forward a more specific time frame for the use of the distinguished forms.

These bronze fibulae are characterised by a rectangular plaque near the end of the long foot which is always set between two smaller or bigger knobs. Foot terminals segmented in this way always lie above the bow. Oval, round or triangular plaques have been documented in addition to this form, and all of

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those forms of fibulae have been distinguished as separate variants (Rustoiu 1997; Bujna 2003; Guštin 2011). The bow generally has a low trapezoidal shape and transforms into a spring with coils connected with an external cord. The foot often ends with an anchor-shaped terminal that covers the spring of the fibula.

Bronze fibulae with a rectangular plaque can be divided into several variants based on the shape of the depression for the enamel, whose distributions may point to the position of the workshops for their manufacture.[1]

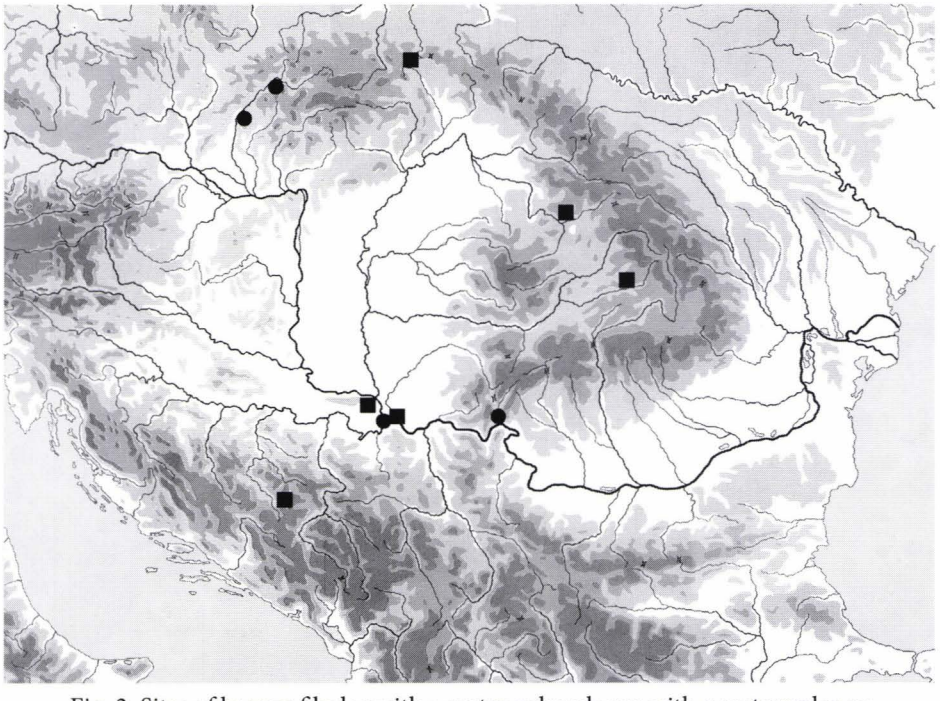

Fig. 2. Sites of bronze fibulae with a rectangular plaque with a rectangular or square depression (▪) and a round or oval depression (●).

Bronze fibulae with a rectangular plaque with a rectangular or square depression (Fig. 2)

A number of fragments of bronze fibulae with a rectangular plaque with variously shaped depressions come from the site of the Radio Station on the banks of the Danube at Zemun. The most common types are those with a depression that follows the shape of the plaque, that is, of rectangular or square shape. There is a completely preserved fibula with a pendant, which has a low trapezoidal bow, above which a rectangular plaque is set between two small knobs (Pl. 1/3). There is a rectangular depression on the plaque, while a shallow groove runs along the edges of the plaque. The foot has a slightly anchor-shaped ending, while the spring consists of six coils with an external cord, on which the pendant is suspended (Todorović 1971, 153, pl. LXIX/9; Popović 2002, 353, pl. III/6). The same site yielded several other fragments of fibulae with rectangular plaques between small knobs on the foot (Pl. 1/1). The rectangular depressions on the plaques generally follow the form of the plaque, sometimes with a shallow groove along the edges. The end of the foot widens gently in the form of an anchor towards the spring. The fibulae are dated to the first century BC (Todorović 1968, 153–155, pl. LIII/10–11, 13–15; LV/14–15; Todorović 1971, 150–153, pl. LXVIII/9, 12, 14; LXIX/1, 3, 5; Popović 2002, 352–353, pl. III/4–5, 7–9). There are several other known fibulae of this type from the Zemun area of which rectangular plaques with depressions of the same shape have been preserved (Tatić-Đurić 1970, 82, pl. II/7, 9). A fragment of another fibula, a stray find, is also recorded (Tatić-Đurić 1970, 82, pl. II/8).

1 I would like to thank my colleague Andrej Preložnik from the Univerza na Primorskem, Inštitut za dediščino Sredozemlja for the comments and information about finds of fibulae with enamel decoration contained in his lecture *La Tène fibulae with an enamelled plate – typological, chronological and cultural outline*, delivered in January 2014 in Klagenfurt at the conference *Die Mittellatènezeit zwischen den Alpen, der Adria und der Donau. Entwicklung der Siedlungs-, Verkehrs- und Wirtschaftstrukturen im mitteleuropäischen Kontext*, A. Preložnik put forward a similar typological classification of fibulae with enamel based on the shape of the plaque and the number of depressions.

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Novi Banovci has also yielded numerous fibulae of this variant. On the foot, between two small knobs, there is a square or rectangular plaque with a depression of the same shape in which traces of enamel are preserved. A groove runs along the edges of the plaque. Some fragments could belong to wasters or unfinished specimens (Sellye 1939, pl. II/3–4, 6–8), which might point to a local production.

At the Kamenjača cemetery of the Daesitiates in Breza near Sarajevo, a single female inhumation furnished with a number of Early La Tène bronze fibulae, yielded a fibula with a long foot on which, above the low trapezoidal bow, between two knobs, there is a rectangular plaque with a depression of the same shape (Pl. 1/2). The foot is ribbed before the knob, while at the end of the bow, above the spring, it ends with an anchor-shaped terminal. The spring of the fibula probably consisted of six coils (Paškvalin 1975, 60, pl. XXXII/9; Paškvalin 2002, 335, pl. 4/4; Paškvalin 2008, 121, pl. 13/10). This is the youngest fibula in the grave which yielded bronze LT B2 Duchcov fibulae of the Karaburma 63 variant.

The Ilişua site yielded a fibula whose foot has a rectangular, almost square plaque between two small knobs, with a depression of the same shape and with a groove along the edges (Pl. 1/5). The end of the foot widens in the form of an anchor above the six-coil spring with an external cord. The fibula is dated to the second–first century BC (Rustoiu 1997, 99; Gaiu 2000, 192, fig. 6/4). A fibula from Uilac (Pl. 1/4) has an almost identical shape of plaque with a depression and an anchor-shaped end of the foot (Beldiman 1993, 184, fig. 2/6; Rustoiu 1997, fig. 25/11). One of the three fibulae from Obišovce in Slovakia has an exceptionally low trapezoidal bow, above which the end of the foot with a plaque between two knobs has been preserved (Pl. 1/6). The rectangular depression on the plaque has rounded ends, giving it an almost oval shape, while a groove runs along the edges of the plaque (Pieta 2010, 31, fig. 8/5).

To this variant we could tentatively attribute the fibula from Ardeu–*Cetăţuie*, which has a preserved foot on which, between two knobs, there is a rectangular plaque. There were probably grooves along all the edges of the plaque, but only one has been preserved, unlike the central depression, which is missing. The end of the foot is widened in the form of an anchor. The fibula is dated to the first century BC (Ferencz 2012, 79–80, fig. 1).

A fibula from Ritopek can be considered as a separate form within the distinguished variant. The fibula has a low trapezoidal bow and a long foot at whose end, between two knobs, there is a narrow rectangular plaque with a depression of the same shape, which occupies most of the plaque. The spring consists of eight coils with an external cord (Todorović 1971, 153, pl. LXIX/7; Popović 2002, 353, pl. III/11).

Bronze fibulae with a rectangular plaque on which there is a round or oval depression (Fig. 2)

The Danube bank near Zemun has yielded a fibula with a rectangular plaque between two knobs, with a perforated oval depression and a shallow groove along the edges of the plaque (Pl. 1/7). The foot of the fibula has a slightly anchor-shaped end above the spring (Popović 2002, 352–353, pl. III/10).[2] The fragment of a fibula from Orşova (Pl. 1/8) has a preserved rectangular plaque with a large round depression (Rustoiu 1997, 99, fig. 25/15). Fibulae from Blatnica and Beluša–*Belušské Slatiny* have a low trapezoidal bow above which, at the end of the foot between two knobs, there is a rectangular plaque with a red enamel preserved in a round depression (Pl. 1/9). On both fibulae the end of the foot gently widens in the form of an anchor toward the spring, which was presumably composed of six-coil spring with internal cord (Pieta 2010, 32, fig. 72/8; F2/2–3).

Bronze fibulae with a rectangular plaque with a hourglass-shaped depression (Fig. 3)

Novi Banovci has yielded a fibula whose long foot, above the low trapezoidal bow, has the end segmented by two knobs, between which there is a rectangular plaque with a hourglass-shaped depression. A groove runs along the edges of the plaque, while the foot widens in the form of an anchor above the spring that probably consisted of six externally connected coils. The fibula is dated to the transition from the Middle to Late La Tène (Majnarić-Pandžić 1970, 37, pl. XXVII/6; Popović 2002, 353).[3] The Danube bank near Zemun yielded a fragment of the foot of a fibula with a rectangular plaque between two small knobs (Pl. 1/10). There is a hourglass-shaped depression on the plaque (Todorović 1968,

2 Interestingly, Todorović did not publish this fragment, so it is possible that it in fact belongs to a fibula with a rectangular depression.

3 Novi Banovci (Majnarić-Pandžić 1970, pl. XXVI–XXVIII) yielded a number of Middle and Late La Tène finds from destroyed graves (LT C1–D1).

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pl. LV/15; Todorović 1971, pl. LXVIII/15; Popović 2002, pl. III/3). Balatonboglár–*Berekre-dűlő* yielded two fibulae, one with a low trapezoidal bow and a long foot that has a rectangular plaque with a hourglass-shaped depression between two knobs above the bow. On the knob before the plaque there are also small oval depressions. The end of the foot has a distinct anchor-shaped widening above the spring that presumably consisted of six externally connected coils. The fibula is dated to the Middle La Tène. The second fibula has a round plaque behind which, towards the spring; there is another transverse rectangular plaque with a narrow depression, followed by yet another, smaller plaque (Bondár *et al.* 2001, pl. IV/3; Németh 2007, 181, 170. kép). By its round plaque the latter fibula is analogous to a fibula dated to LT C1 from the Holiare cemetery (Benadík 1957, Obr. 28/5) as well as to the fibulae from grave 17 of the Jászberény–*Cserőhalom* cemetery, likewise dated to LT C1 (Kaposvári 1969, 180, 1. kép/9, 11; 11. kép/1, 3).

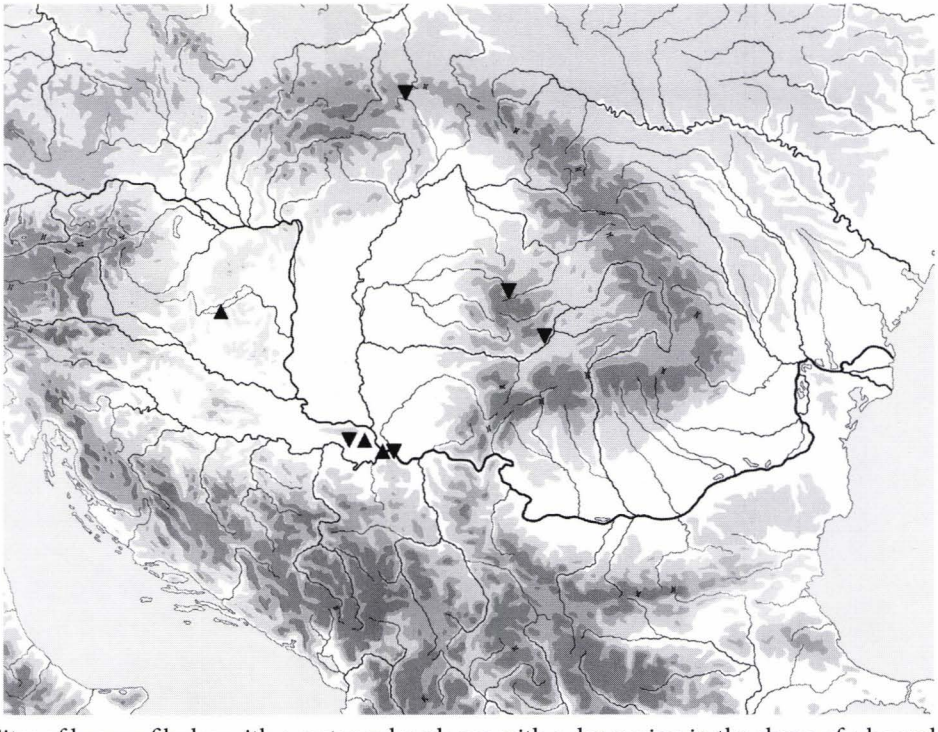

Fig. 3. Sites of bronze fibulae with a rectangular plaque with a depression in the shape of a hourglass (▲) and with depressions in the shape of two hourglasses with or without a small round depression (▼).

Bronze fibulae with a rectangular plaque on which there is a depression in the shape of two hourglasses with or without a small round depression (Fig. 3)

The Zemun–*Kapela* site yielded a fragment of a fibula with the preserved end of the foot with a plaque and a small knob (Pl. 1/11). The plaque has depressions in the shape of two hourglasses with a round depression between them, while a groove runs along the longer edges of the plaque (Todorović 1968, 153, pl. LIII/12; Todorović 1971, 152, pl. LXVIII/7; Popović 2002, 352, pl. II/8). The remaining part of a fibula from Novi Banovci consists of the rectangular plaque with a central depression in the form of a concentric circle, and another hourglass-shaped depression on either side (Sellye 1939, pl. II/2). From Alba Iulia is a fibula with a low trapezoidal bow and a long foot on which, above the bow, between two small knobs, there is a rectangular plaque with two hourglass-shaped depressions, with a round depression between them (Pl. 2/1). The foot ends with a slightly anchor-shaped terminal above the spring consisting of six coils connected externally by a high-placed cord (Moga 1981, 81, fig. 2; Beldiman 1993, 181, fig. 2/1; Rustoiu 1997, fig. 25/13). From Căpuşu Mare comes a fragment of a fibula of the same shape, which also, between two knobs, has a rectangular plaque with depressions in the shape of two hourglasses and a round depression between them (Pl. 1/12). The fibula again consists of a six-coiled spring with external cord (Horedt 1952, fig. I/7; Beldiman 1993, 181, fig. 2/3; Rustoiu 1997, fig. 25/14). One of the fibulae from Obišovce, in fact the least well-preserved example, has a plaque of an almost oval shape, with a barely discernible knob preserved with it (Pl. 2/2). On the plaque there

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are depressions in the shape of two hourglasses, between which there is an additional round depression (Pieta 2010, 31, fig. 8/6).

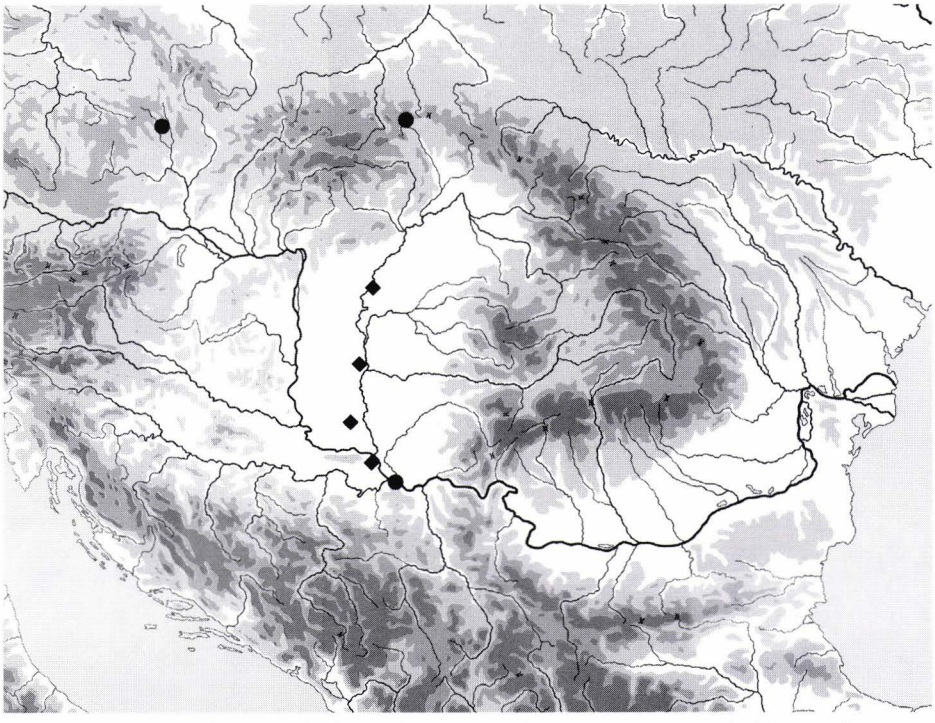

Fig. 4. Sites of bronze fibulae with a central depression surrounded by smaller depressions (♦) and with curvilinear depressions (●).

Bronze fibulae with a rectangular plaque on which there is a curvilinear depression (Fig. 4)

Vinča has produced a fragment of a fibula of which a rectangular plaque set between two small knobs has been preserved (Pl. 2/3). There are two opposing crescent-shaped depressions on the plaque (Tatić-Đurić 1970, 82, pl. II/6). A fibula from Horni Věstonice–*Na lukách* has a low trapezoidal bow and a long foot on which, between two small knobs, is a rectangular plaque on which can be seen two crescent-shaped depressions (Pl. 2/4). The foot has a slightly anchor-shaped end and another small triangular depression above the spring. The spring is not completely preserved, but it probably had six coils (Čizmář 2005, 131, fig. 1/1). One of the fibulae from Obišovce has a low trapezoidal bow above which, at the end of the foot, there is a rectangular plaque on which there are two depressions in the shape of the letter S and between which there is another smaller round depression (Pl. 2/5). There is a small knob at the end of the foot, while the end of the foot widens into the shape of an anchor above which is the spring composed of six coils with an external cord (Pieta 2010, 31, fig. 8/4).

Bronze fibulae with a rectangular plaque on which there is a central depression surrounded by small depressions in the corners (Fig. 4)

A specific variant of fibulae has depressions on the rectangular plaque, forming a complex composition consisting of a large central depression in the shape of a cross or a rhombus, with a smaller triangular, round or oval depressions in the corners. The central cross-shaped depression, except in the case of the fibula from Gospođinci, has the shape of a rhombus with concave sides.

Novi Banovci yielded also a fragment of the foot of a fibula with a knob and rectangular plaque connected by a round plaque, suggesting that we are dealing with unfinished specimens. The central depression on the plaque has the shape of a rhombus or cross, while the smaller depressions in the corners are triangular (Sellye 1939, pl. II/1). From Gospođinci–*Šuma Parohija* comes a fibula with a rectangular plaque between two small knobs, which has a cross-shaped depression in the middle and a small round depression in each corner (Pl. 2/6). The foot widens in the form of an anchor above the spring. The fibula is dated to Late La Tène (Medović 1998, 92, pl. 46/4; Popović 2002, 353, pl. II/10). Two fibulae from

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a grave at the Törökszentmiklós–*Surján* site have a similar central depression shaped as a rhombus or cross like the fibula from Novi Banovci (Fig. 2/7–8). The fibulae have long feet that, above the low trapezoidal bow and between small knobs, have a rectangular plaque with a central depression in the middle and four smaller ones in the corners. The foot widens in the form of an anchor above the spring that was probably composed of six coils with external cord. The same grave contained a bronze belt composed of rectangular segments and a zoomorphic buckle which dates the grave to LT C1 (Stanczik–Vaday 1971, 24, fig. 3/4–5; Szabó 1988, fig. 51; Teleagă 2008, 95, fig. 5/2). A fragment of the foot of a fibula with a plaque decorated in the similar way (Pl. 2/10) is known from an unknown site, probably somewhere in the Tisza Basin considering the other documented sites of this variant. There is a rhombic or cross-shaped depression in the centre, while the large depressions in the corners are crescent-shaped (Sellye 1939, pl. II/9). The settlement of Szeged–*Kiskundorozsma* yielded a fibula with a low trapezoidal bow above which, between two knobs, there is a rectangular plaque, while the foot has an anchor-shaped terminal (Pl. 2/9). The spring consists of eight coils with external cord. On the plaque there is a rhombic-shaped central depression and a triangular depression in each corner. The settlement is dated to LT C1b–LT C2 (Pilling–Ujvári 2012, 221, pl. 7/1).

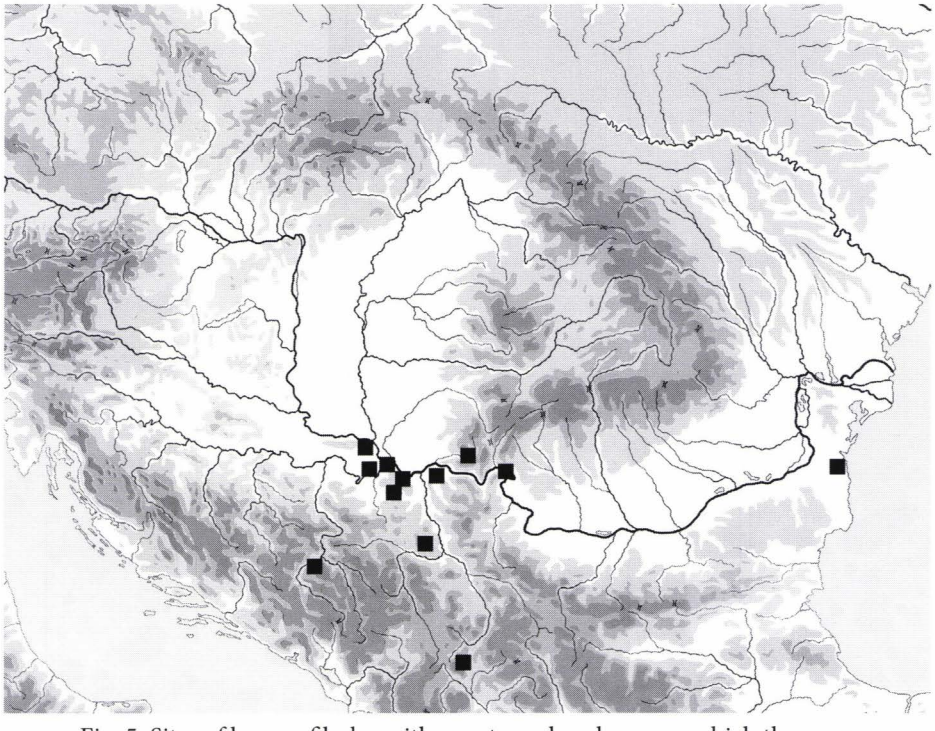

Fig. 5. Sites of bronze fibulae with a rectangular plaque on which there are depressions with opposing series of triangles – the Boljevci variant.

Bronze fibulae with a rectangular plaque on which there are depressions with opposing series of triangles – the Boljevci variant (Fig. 5)

A separate variant of fibulae with a rectangular plaque decorated with enamel consists of a form that is mostly known from the distribution area of the Scordisci (Popović 2002). These fibulae have two opposing series of three triangular depressions on the plaque, separated by concentric circles. The points of the triangles sometimes touch, creating the impression that the plaque is decorated with three hourglasses. The end of the foot has a distinctly anchor-shaped terminal above the spring, which is has the shape of an elongated rectangular plaque.

Near the end of the long foot of a fibula found in the area of the Scordiscan cemetery at Boljevci, between two small knobs, there is a rectangular plaque on which there are two opposing series of three triangular depressions inset with yellow and blue enamel (Pl. 2/11). Between the triangular depressions, in the middle of the plaque, there are four concentric circles. The fibula has a low triangular bow, while the end of the foot widens into the form of an anchor with an elongated rectangular plaque above the spring composed of six coils with external cord (Hunyady 1942, pl. XXI/11; Majnarić-Pandžić 1970,

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15, pl. I/5; Jovanović 1987, 840–841, pl. LXXXIII/7; Popović 2002, 352, pl. II/7).[4] An almost identical fibula was found at the Kacipup site near Oraovica (Preševo) in southern Serbia (Pl. 2/12). Near the end of the foot, between two small knobs, there is a rectangular plaque with two opposing series of three triangular depressions between which there are four concentric circles. A groove runs along the edge of the plaque. The foot widens towards the spring into an elongated rectangular plaque. The fibula is dated to the second century BC, while the site itself yielded also a Late La Tène iron spur and sherds dated to the end of the second and the beginning of the first century BC (Bulatović 2000, 327, pl. 2/2; Popović 2002, 352, pl. III/1; Popović 2009, 250, fig. 2/15).

Novi Banovci yielded a part of the foot of a fibula with a rectangular plaque and a knob. On the plaque, which has a groove along the edges, there are two opposing series of three triangular depressions separated by two concentric circles (Sellye 1939, pl. II/5). Another fibula from Novi Banovci also has two series of triangular depressions separated by four concentric circles (Pl. 2/13). There are two annular knobs near the end of the foot which ends with an anchor-shaped terminal (Koščević 1992, 77, pl. 6/71).

From Kosmaj we have a part of the bow and foot of a fibula with a rectangular plaque between small knobs on either side (Pl. 2/14). There are two series of three triangular depressions on the plaque with four concentric circles between them. The end of the foot is widened in the shape of an anchor, and there is a triangular depression on it (Petrović 1997, 98, 146, cat. no. 213; Ratković 2013, 138, cat. no. 1107). From the area around the confluence of the Sava and Danube there is also mention of several enamelled fibulae of unknown form from Zemun, Vinča and Brestovik (Ratković 2013, 138). Due to this uncertainty we believe that the fibula supposedly found at Beli breg is in fact the previously mentioned fibula from the nearby site of Brestovik. Only the rectangular plaque with a small knob on either side is preserved (Pl. 3/1). There is a groove along the edges of the plaque which is decorated with two series of triangular depressions separated by four concentric circles (Tatić-Đurić 1970, 84, pl. III/6).

From southern Serbia is the site of Veliki Vetren, which has yielded abundant remains of weapons and horse gear of LT D1 date (Stojić 1999; 2003); there also the end of the foot of a fibula with a rectangular plaque set between two small knobs (Pl. 3/2). The plaque is decorated similarly to the already mentioned specimens, while at the very end the foot widens into a narrow rectangular plaque. The fibula is dated to the second–first century BC (Stojić 2003, 90, cat. no. 306). Yet another fibula with a rectangular plaque with triangular depressions comes from Mahrevići in eastern Bosnia.[5]

In addition to the area settled by the Scordisci, the fibulae of this type have been documented in the neighbouring area of the Lower Danube Basin. For instance, from Constanţa comes the end of the foot with a rectangular plaque between two small knobs (Pl. 3/3). The plaque is decorated with two opposing series of three triangles, between which there are four concentric circles. The very end of the foot widens into a narrow rectangular plaque (Rustoiu 1997, 99, fig. 25/9). From Banat–Đerdap or the Iron Gates comes a fibula with a low trapezoidal bow and long foot that, above the bow, between two small knobs, has a rectangular plaque decorated in the same way (Pl. 3/5). There is a groove along the edges of the plaque, while the foot widens at the end into a narrow rectangular plaque, set above the spring composed of six coils with an external cord (Rustoiu 1997, 99, fig. 25/17). Banat yielded also a rectangular plaque between two small knobs which is decorated with the same motif, while a groove runs along the edges (Pl. 3/4). Near the end, above the spring, the foot widens into an elongated rectangular plaque (Rustoiu 1997, 99, fig. 25/16).

A fragment of a fibula from Zemun, of which a rectangular plaque with a single knob is preserved, can be attributed to the fibulae of the Boljevci variant (Pl. 3/8). There are two opposing triangular depressions on the plaque separated by three concentric circles (Tatić-Đurić 1970, 82, pl. II/5).

As a special form of this variant we can distinguish the fibulae with rectangular plaques and triangular depressions arranged in two opposing series, between which there are no concentric circles.

4 Majnarić-Pandžić (1970, 105, note 31) corrects Hunyady (1942, pl. XXI/11), mentioning that this was not the fibula from Stari Banovci, but from Boljevci. Boljevci (Majnarić-Pandžić 1970, pl. I–II) yielded Middle and Late La Tène (LT C1–D1) finds that in all likelihood come from destroyed graves.

5 The fibula is mentioned by Ana Marić (Sarajevo) in her paper *Material Culture of the Middle La Tène Period in Bosnia and Herzegovina* at the conference *Die Mittellatènezeit zwischen den Alpen, der Adria und der Donau. Entwicklung der Siedlungs-, Verkehrs- und Wirtschaftstrukturen im mitteleuropäischen Kontext* given in Klagenfurt in January 2014.

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A fragment of fibulae of this type comes from the Mlava basin (Pl. 3/6–7). The only thing that has remained of this fibula is a rectangular plaque with two opposing series of three triangles and a groove along the edge of the plaque (Stojić 2000, 61, pl. I/43). The same site yielded also a rectangular plaque with kidney-shaped depressions (Stojić 2000, 61, pl. I/44). From the Danube bank near Zemun comes a fragment of the end of the foot with a rectangular plaque between two small knobs (Pl. 3/9). On the plaque there are two opposing series of two triangular depressions, likewise lacking concentric circles between them (Todorović 1968, 153, pl. LIII/16; Todorović 1971, 152, pl. LXIX/2; Popović 2002, 352, pl. II/9).

In addition to bronze fibulae with rectangular plaques which are the most common form, there are many known bronze and iron fibulae with variously shaped plaques documented at sites throughout the Carpathian Basin and the south-eastern Alpine area. For instance, in Romania, as the b variant fibulae were distinguished those with oval plaques that share the identical structural features with the fibulae with rectangular plaques (Rustoiu 1997, 38–39, fig. 25). A fibula from Berindia, for example, at the end of the foot between two small knobs, has an oval plaque with a partition at the middle (Dumitrașcu–Ordentlich 1973, 66, fig. 16; Beldiman 1993, 181, fig. 2/2).

Fibulae with a triangular plaque

As a separate form we can distinguish fibulae with triangular depressions at the end of the foot; their remaining typological features, such as the position of the plaques at the end of the foot and the trapezoidal bow, they correspond to the forms with rectangular plaques.

Grave LT 12 in Zvonimirovo contained a pair of iron fibulae that have, at the end of the long foot, a bronze triangular section with a rectangular depression, which has a perforation at the bottom which passes also through the triangular bow (Pl. 3/10–11). The fibulae presumably belonged to the woman contained in what was a triple burial of LT C2 date (Majnarić-Pandžić 2001, 86, pl. VII/1; Dizdar 2013, 245–247, pl. 27/1–2). A similar iron fibula with a bronze triangular depression was found in the female grave 195 at Kapiteljska njiva (Fig. 7/3). Based on the associated finds, the grave was dated to the Mokronog IIb phase (Križ 2001; 2005, 22, pl. 57/5). Grave A32 from Gracarca contained an iron fibula with a triangular depression. The fibula has a low bow and a spring composed of six coils with external cord, the grave is dated to LT C1 (Gleirscher 2009, 152, fig. 5/10). Associated with a bronze belt in cremation grave 741 of the Holiare cemetery was a bronze fibula with a triangular plaque between two small knobs at the end of the foot (Pl. 3/12). The spring of the fibula also consists of six coils with external cord. This grave, too, is dated to LT C1 (Benadík 1957, 96, fig. 28/3–4).

Iron fibulae from the cemeteries of the Mokronog group in Dobova and Brežice belong to a separate type. Grave 25 in Dobova, dating to the Mokronog IIb phase, contained a large fibula with a long foot that has a rectangular plaque with folded lateral ends at the joint with the bow. The foot is attached to the bow by a knob, while the spring has six coils. Between two oval extensions on the foot of a fibula from grave 44 in Brežice there is a rectangular plaque with a depression. The spring consists of ten coils with external cord (Jovanović 2007, 35, 54, fig. on p. 35F, cat. no. 34–35). From the south eastern Alpine area there are also fibulae from Vinica, which, based on their structural features, although they also have rectangular plaques, probably relate to local forms (Gabrovec 1966, 191, pl. 17/5, 7).

Bronze fibulae with small, transverse depressions on the foot are another distinct type. For instance, a grave from Kablarovac near Gradina on the Bosut River contains a fibula with a trapezoidal bow on whose long foot, between two large knobs, there is a transverse depression which probably contained enamel or glass. The strap bow of the fibula extends into a spiral composed of sixteen coils with an external cord (Popović 2002, 352, pl. II/6; Popović 2003, 313, pl. 4/2). A similar bronze fibula was found in cremation grave 11 at the Vác–*Gravel pit* cemetery. Between two knobs on the foot there is a rectangular depression, while the low bow which extends into a spring composed of four coils with external cord. The grave contained also a bronze belt with a zoomorphic buckle composed of rectangular segments which have been filled with enamel or decorated with motifs of concentric circles. Judging from all the finds in the grave it was attributed to the burial of a prominent woman and dated to LT C1 (Hellebandt 1999, 60, pl. XXVI/9). The site of Nagyhörcsök contained a fibula with a rectangular plaque with a depression set between two knobs, while the spring consists of six coils with external cord (Hunyady 1942, pl. XXI/15).

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During the Late La Tène period the find from the collective grave at Gomolava and certain finds from other sites also bear witness to the presence of bronze fibulae with variously shaped plaques with depressions for enamel (Guštin 2011, 125–126, fig. 8). These fibulae, unlike those with rectangular plaques, often contain characteristic lateral protrusions on the central plaque. With regard to the shape of the plaque and the protrusions, as well as the spatial distribution, two basic types can be distinguished.

The first type is represented by fibulae from Gomolova, one from the collective grave, while a fragment of the other one comes from a pit (Pl. 3/14). Between two knobs on the foot of the fibulae there is a triangular plaque with incisions along the edge, which has a lateral protrusion on either side in the shape of a bird's head on which the eyes are indicated by concentric circles. There is a triangular depression in the middle of the plaque, while at the end of the foot there is a rectangular plaque with a semicircular or oval depression in the middle and a circular protrusion on either shorter side, which is likewise decorated with the motif of a concentric circle. The spring of the fibula from the collective grave consists of twelve coils (Jovanović–Jovanović 1988, 56–57, 173, fig. 17, pl. 42/13; 43/2a–c; Pavlin 2007, 761–762, fig. 3/5–6). To this class we can also attribute the fragment of a fibula from Donja Dolina, with a triangular plaque on which there is a depression of the same shape and which has on either side a damaged lateral protrusion. The foot ends with a narrow rectangular plaque with a semicircular depression, while there is an additional depression along either of the shorter sides. In the same vein, there is a protrusion on either of the lateral sides (Marić 1964, pl. 20/14; Pavlin 2007, 761, fig. 3/4).

Bronze fibulae or fragments from the sites of the Mokronog group belong to the second type. The cemetery at Strmec nad Belo Cerkvo yielded two fibulae connected with a small chain on which spectacle-shaped pendants are suspended (Pl. 3/16–17). The fibulae have a semicircular bow and ribbed foot on which, above the bow, there is a rhombic plaque with a triangular depression. On each side of the plaque there is a lateral semicircular protrusion with a circular depression, while the end of the foot has the shape of a narrow rectangular plaque, set above the spring. On either lateral end of the rectangular plaques there is a semicircular protrusion with a depression, while the edges of the plaques are decorated with incisions (Stare 1973, 43, pl. 54/1–2; Dular 1991, 54–55, fig. 26; Pavlin 2007, 760–761, fig. 3/2–3). The fibulae probably belong to the Mokronog IIIa phase. To this type belongs also a fibula from Valična Vas, which on the foot, between two ribs on each side, has a rather oval plaque with a triangular depression (Fig. 8/2). Its long spring composed of twelve coils is preserved, too (Teržan 1973, 667, pl. 5/4; Pavlin 2007, 761, fig. 3/1). The fragment of a fibula from the elevated settlement of Grac pri Selih pri Zajčjem Vrhu has a triangular end of the foot with a depression of the same shape, around which, on each side, there is an additional line. There were probably protrusions on the lateral side. The link by which the foot was attached to the bow of the fibula, dated to the Mokronog IIIa phase, is also preserved (Pavlin 2007, 760–761, fig. 2/2). The fragment of a fibula from Ostrovul Şimian, otherwise attributed to the fibulae of variant 5b (Rustoiu 1997), is also attributed to this class. On this fragment there is a preserved oval plaque, set between two knobs, with a protrusion on either lateral side (Beldiman 1993, 183, fig. 2/4).

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Based on grave finds, bronze fibulae with rectangular plaques on which there are variously shaped depressions for enamel, can be considered a characteristic part of the Middle La Tène female costume in the Carpathian Basin. Fibulae of this heterogeneous group are divided into a number of variants, primarily based on the shapes of depressions, which were probably filled with polychrome enamel. Earlier assumptions pointed out that these fibulae can be considered a characteristic form of the material heritage of the Scordisci, whose distribution area yielded most finds. However, recent investigations have shown that they were distributed from the Lower Danube Basin and Transylvania to the northern parts of the Carpathian Basin (Fig. 1). The classification into a number of variants perhaps points to the existence for their production of various workshops, where even fibulae attributed to a single variant may have come from different workshops, just as the fact that individual workshops may have produced different variants of fibulae (Fig. 2 and 3). In the same vein, the concentration of finds in the eastern part of the confluence of the Sava and Danube, as well as in Transylvania, the Tisza Basin and recently in south western Slovakia, points to the probable location of the workshops, especially of the types that

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can be considered as Middle La Tène forms. The observed concentration of finds along the Danube from Zemun to Novi Banovci seems to corroborate the assumption that certain forms were indeed produced in eastern Syrmia, as corroborated by the find of a miscast plaque of a fibula found on the bank of the Danube. In the same vein, fibulae with depressions on the rectangular plaque forming a complex composition have so far most commonly been documented in the Middle and Lower Tisza Basin (Fig. 4) in addition to the find from Novi Banovci, which certainly points to the position of workshops which produced them in that area. Likewise, we should not exclude the possibility of the existence of workshops for certain forms in Transylvania, as shown by recent finds. On the other hand, contemporaneous fibulae with a triangular plaque can be considered as products of workshops situated in the south east Alpine and south west Pannonian areas.

The single find so far from a grave at the Törökszentmiklós–*Surján* site dated to LT C1, does not allow a precise dating, although their presence at certain other sites, for example Obišovce, which mainly yielded finds of LT C2 date, suggests that they were probably produced from the end of the earlier phase of Middle La Tène and during its younger phase or of LT C1b–C2. This appears to be corroborated by the finds of bronze belts with rectangular or lyre-shaped segments, which were also decorated with enamel and formed an important part of the Middle La Tène female attire. That both belts and fibulae belong to the products of the same workshops is corroborated by the similarly organised and shaped depressions for inserting enamel. This corresponds to our knowledge of the production methods of fibulae with triangular plaques which can be dated to the end of the third and the first half of the second century BC. The most decorative fibulae attributed to the Boljevci variant have never been documented in any burial context which renders their dating more difficult. Nevertheless, their presence at Boljevci, Veliki Vetren or Kacipup, with other finds from the end of the Middle and the beginning of Late La Tène, allows us to date them with a high degree of certainty to LT C2 or to the beginning of LT D1 at the latest with a workshop or workshops situated in the distribution area of the Scordisci (Map 5), probably in eastern Syrmia and northern Serbia, from where they arrived further east through the mediation of the Little Scordisci. The indisputable Late La Tène forms (LT D1) are represented by characteristic forms documented in the territories of the Scordisci (the Gomolava type) and the Taurisci (the Bela Cerkev type), which again point to the regionalisation of the forms of female costume, noticeable already from the Early La Tène which represented an important part of the visual identity of the communities.

Appendix 1
List of sites

Bronze fibulae with a rectangular plaque with a rectangular or square depression (Fig. 2)

- Danube bank near Zemun (Todorović 1968, 153–155, pl. LIII/10–11, 13–15; LV/14–15; Todorović 1971, 150–153, pl. LXVIII/9, 12, 14; LXIX/1, 3, 5, 9; Popović 2002, 352–353, pl. III/4–9);
- Zemun (Tatić-Đurić 1970, 82, pl. II/7, 9);
- unknown site (Tatić-Đurić 1970, 82, pl. II/8);
- Novi Banovci (Sellye 1939, pl. II/3–4, 6–8);
- Kamenjača in Breza (Paškvalin 1975, 60, pl. XXXII/9; Paškvalin 2002, 335, pl. 4/4; Paškvalin 2008, 121, pl. 13/10);
- Ilişua (Rustoiu 1997, 99; Gaiu 2000, 192, fig. 6/4);
- Uilac (Beldiman 1993, 184, fig. 2/6; Rustoiu 1997, fig. 25/11);
- Obišovce (Pieta 2010, 31, fig. 8/5).

Bronze fibulae with a rectangular plaque on which there is a round or oval depression (Fig. 2)

- Danube bank near Zemun (Popović 2002, 352–353, pl. III/10);
- Orşova (Rustoiu 1997, 99, fig. 25/15);
- Blatnica (Pieta 2010, 32, fig. 72/8; F2/2);
- Beluša–*Belušské Slatina* (Pieta 2010, 32, F2/3).

Bronze fibulae with a rectangular plaque with a hourglass-shaped depression (Fig. 3)

- Novi Banovci (Majnarić-Pandžić 1970, 37, pl. XXVII/6; Popović 2002, 353);

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- Danube bank near Zemun (Todorović 1968, pl. LV/15; Todorović 1971, pl. LXVIII/15; Popović 2002, pl. III/3);
- Balatonboglár–*Berekre-dűlő* (Bondár *et al.* 2001, pl. IV/3; Németh 2007, 181, 170. kép).

Bronze fibulae with a rectangular plaque on which there is a depression in the shape of two hourglasses with or without a small round depression (Fig. 3)

- Zemun–*Kapela* (Todorović 1968, 153, pl. LIII/12; Todorović 1971, 152, pl. LXVIII/7; Popović 2002, 352, pl. II/8);
- Novi Banovci (Sellye 1939, pl. II/2);
- Alba Iulia (Moga 1981, 81, fig. 2; Beldiman 1993, 181, fig. 2/1; Rustoiu 1997, fig. 25/13);
- Căpuşu Mare (Horedt 1952, fig. I/7; Beldiman 1993, 181, fig. 2/3; Rustoiu 1997, fig. 25/14);
- Obišovce (Pieta 2010, 31, fig. 8/6).

Bronze fibulae with a rectangular plaque on which there is a curvilinear depression (Fig. 4)

- Vinča (Tatić-Đurić 1970, 82, pl. II/6);
- Horni Věstonice–*Na lukách* (Čizmář 2005, 131, fig. 1/1);
- Obišovce (Pieta 2010, 31, fig. 8/4).

Bronze fibulae with a rectangular plaque on which there is a central depression surrounded by small depressions in the corners (Fig. 4)

- Novi Banovci (Sellye 1939, pl. II/1);
- Gospođinci (Medović 1998, 92, pl. 46/4; Popović 2002, 353, pl. II/10);
- Törökszentmiklós–*Surján* (Stanczik-Vaday 1971, 24, fig. 3/4–5; Szabó 1988, fig. 51; Teleagă 2008, 95, fig. 5/2);
- Szeged–*Kiskundorozsma* (Pilling-Ujvári 2012, 221, pl. 7/1);
- unknown site (Sellye 1939, pl. II/9).

Bronze fibulae with a rectangular plaque on which there are depressions with opposing series of triangles – the Boljevci variant (Fig. 5)

- Boljevci (Hunyady 1942, pl. XXI/11; Majnarić-Pandžić 1970, 15, pl. I/5; Jovanović 1987, 840–841, pl. LXXXIII/7; Popović 2002, 352, pl. II/7);
- Kacipup near Oraovica (Bulatović 2000, 327, pl. 2/2; Popović 2002, 352, pl. III/1; Popović 2009, 250, fig. 2/15);
- Novi Banovci (Sellye 1939, pl. II/5; Koščević 1992, 77, pl. 6/71);
- Kosmaj (Petrović 1997, 98, 146, cat. no. 213; Ratković 2013, 138, cat. no. 1107);
- Beli breg (Tatić-Đurić 1970, 84, pl. III/6);
- Veliki Vetren (Stojić 2003, 90, cat. no. 306);
- Mahrevići;
- Constanţa (Rustoiu 1997, 99, fig. 25/9);
- Banat-Iron Gate (Rustoiu 1997, 99, fig. 25/17);
- Banat (Rustoiu 1997, 99, fig. 25/16);
- Mlava valley (Stojić 2000, 61, pl. I/43–44);
- Zemun (Tatić-Đurić 1970, 82, pl. II/5);
- Danube bank near Zemun (Todorović 1968, 153, pl. LIII/16; Todorović 1971, 152, pl. LXIX/2; Popović 2002, 352, pl. II/9).

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List of figures

Fig. 1. Sites of bronze fibulae with a rectangular plaque and enamel decoration.
Fig. 2. Sites of bronze fibulae with a rectangular plaque with a rectangular or square depression (▪) and a round or oval depression (●).
Fig. 3. Sites of bronze fibulae with a rectangular plaque with a hourglass-shaped depression (▲) and with depressions in the shape of two hourglasses with or without a small round depression (▼).
Fig. 4. Sites of bronze fibulae with a central depression surrounded by smaller depressions (♦) and with curvilinear depressions (●).
Fig. 5. Sites of bronze fibulae with a rectangular plaque on which there are depressions with opposing series of triangles – the Boljevci variant.

List of plates

Pl. 1. 1. Danube bank near Zemun (after Todorović 1971); 2. Breza (after Paškvalin 2008); 3, 7, 10. Danube bank near Zemun (after Popović 2002); 4. Uilac (after Rustoiu 1997); 5. Ilişua (after Gaiu 2000); 6. Obišovce (after Pieta 2010); 8. Orşova (after Rustoiu 1997); 9. Blatnica (after Pieta 2010); 11. Zemun (after Todorović 1971); 12. Căpuşu Mare (after Rustoiu 1997).
Pl. 2. 1. Alba Iulia (after Moga 1981); 2. Obišovce (after Pieta 2010); 3. Vinča (after Tatić-Đurić 1970); 4. Horni Věstonice (after Čizmář 2005); 5. Obišovce (after Pieta 2010); 6. Gospođinci (after Medović 1998); 7–8. Törökszentmiklós (after Szabó 1988); 9. Szeged-*Kiskundorozsma* (after Pilling-Ujvári 2012); 10. unknown site (after Sellye 1939); 11. Boljevci (after Popović 2002); 12. Kacipup (after Bulatović 2000); 13. Novi Banovci (after Koščević 1992); 14. Kosmaj (after Petrović 1997).
Pl. 3. 1. Beli breg (after Tatić-Đurić 1970); 2. Veliki Vetren (after Stojić 2003); 3. Constanţa (after Rustoiu 1997); 4. Banat (after Rustoiu 1997); 5. Banat–Iron Gates (after Rustoiu 1997); 6–7. Mlava valley (after Stojić 2000); 8. Zemun (after Tatić-Đurić 1970); 9. Danube bank near Zemun (after Todorović 1971); 10. Zvonimirovo (after Dizdar 2013); 11. Novo Mesto (after Križ 2005); 12. Kapiteljska njiva; 13. Holiare (after Benadík 1957); 14. Gomolava (after Jovanović-Jovanović 1988); 15. Valična Vas (after Pavlin 2007); 16–17. Strmec nad Belo Cerkvo (after Pavlin 2007).

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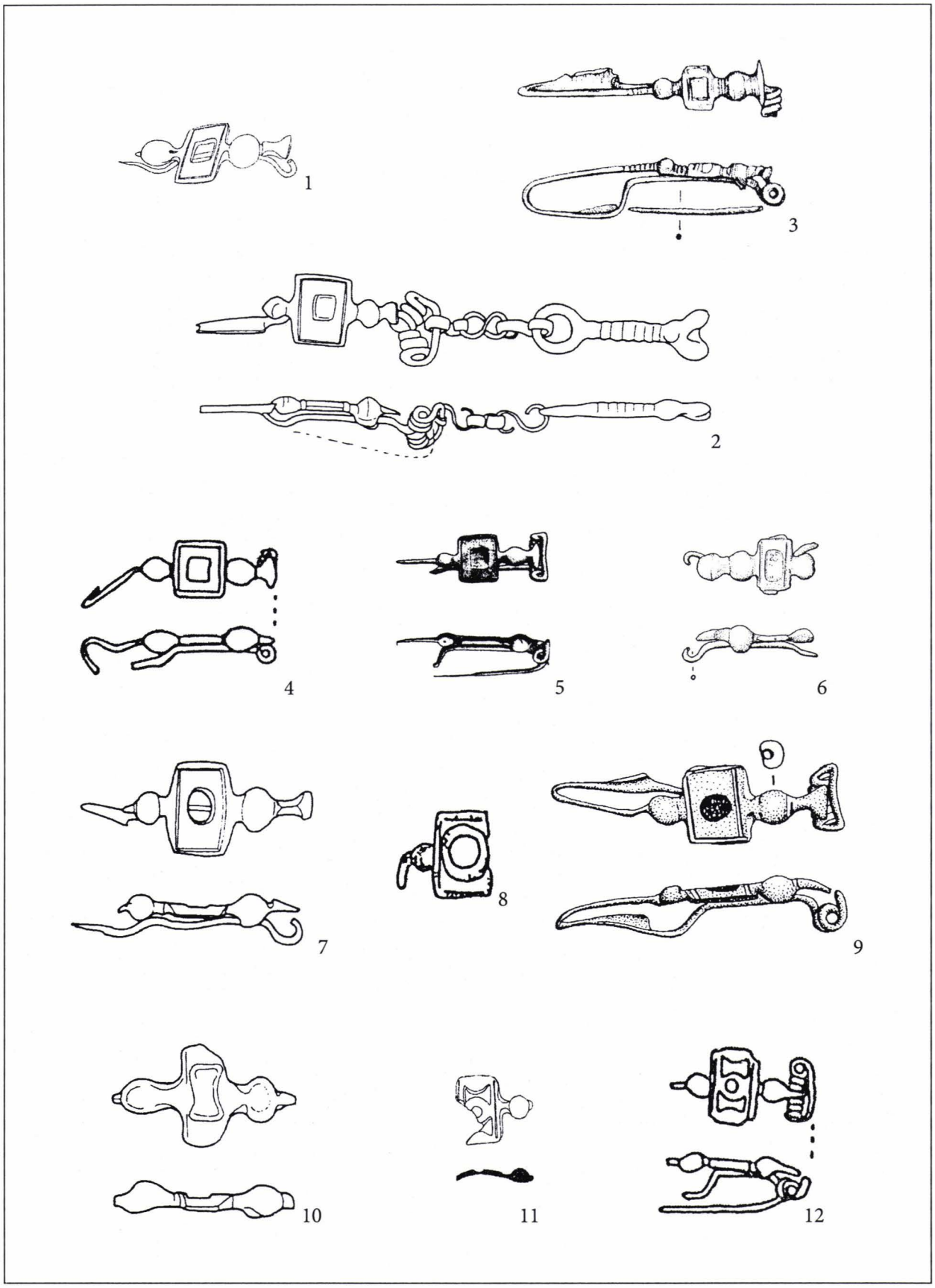

Plate 1. 1. Danube bank near Zemun (after Todorović 1971); 2. Breza (after Paškvalin 2008); 3, 7, 10. Danube bank near Zemun (after Popović 2002); 4. Uilac (after Rustoiu 1997); 5. Ilişua (after Gaiu 2000); 6. Obišovce (after Pieta 2010); 8. Orşova (after Rustoiu 1997); 9. Blatnica (after Pieta 2010); 11. Zemun (after Todorović 1971); 12. Căpuşu Mare (after Rustoiu 1997).

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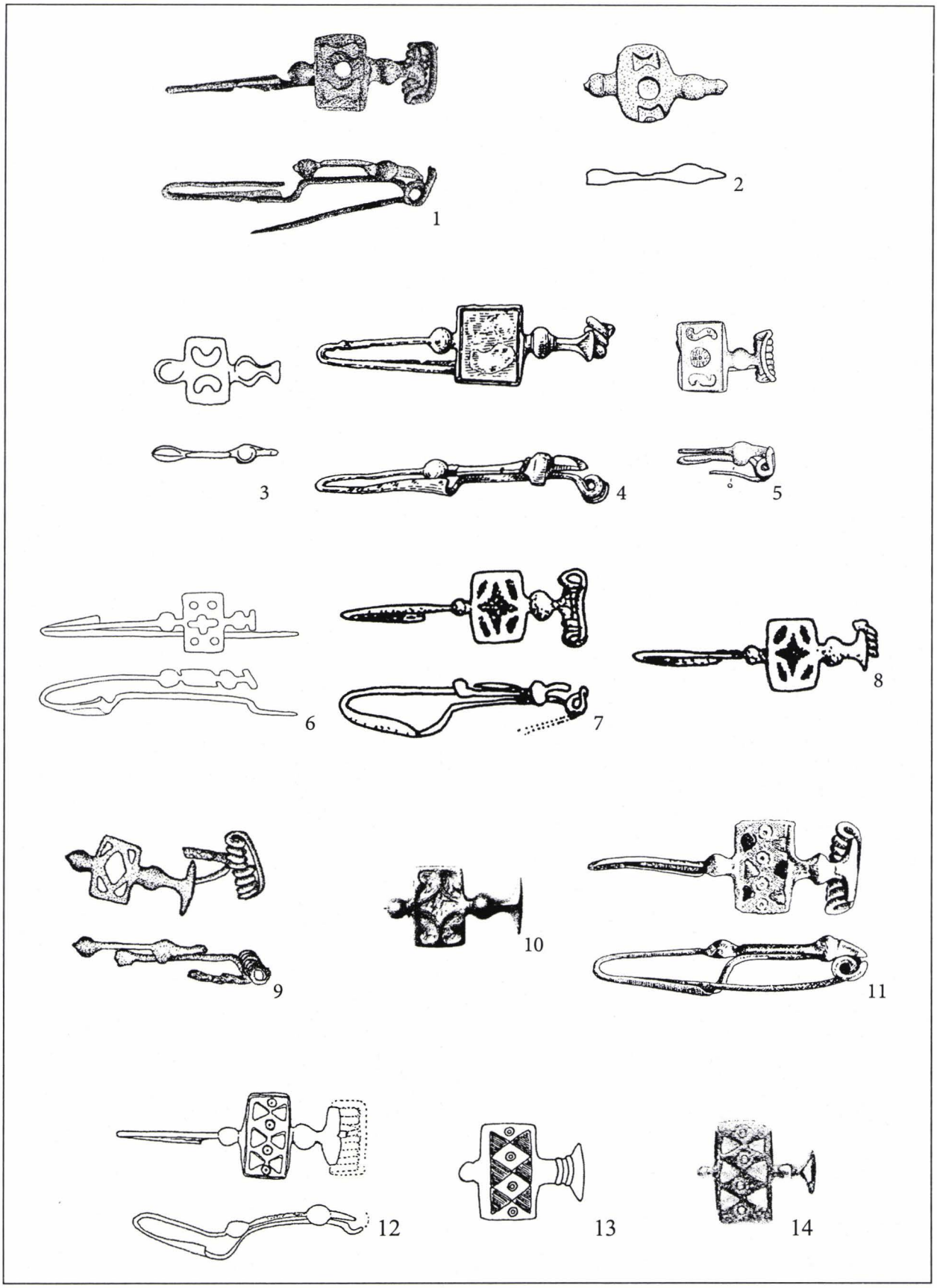

Plate 2. 1. Alba Iulia (after Moga 1981); 2. Obišovce (after Pieta 2010); 3. Vinča (after Tatić-Đurić 1970); 4. Horni Věstonice (after Čizmář 2005); 5. Obišovce (after Pieta 2010); 6. Gospođinci (after Medović 1998); 7–8. Törökszentmiklós (after Szabó 1988); 9. Szeged–Kiskundorozsma (after Pilling–Ujvári 2012); 10. unknown site (after Sellye 1939); 11. Boljevci (after Popović 2002); 12. Kacipup (after Bulatović 2000); 13. Novi Banovci (after Koščević 1992); 14. Kosmaj (after Petrović 1997).

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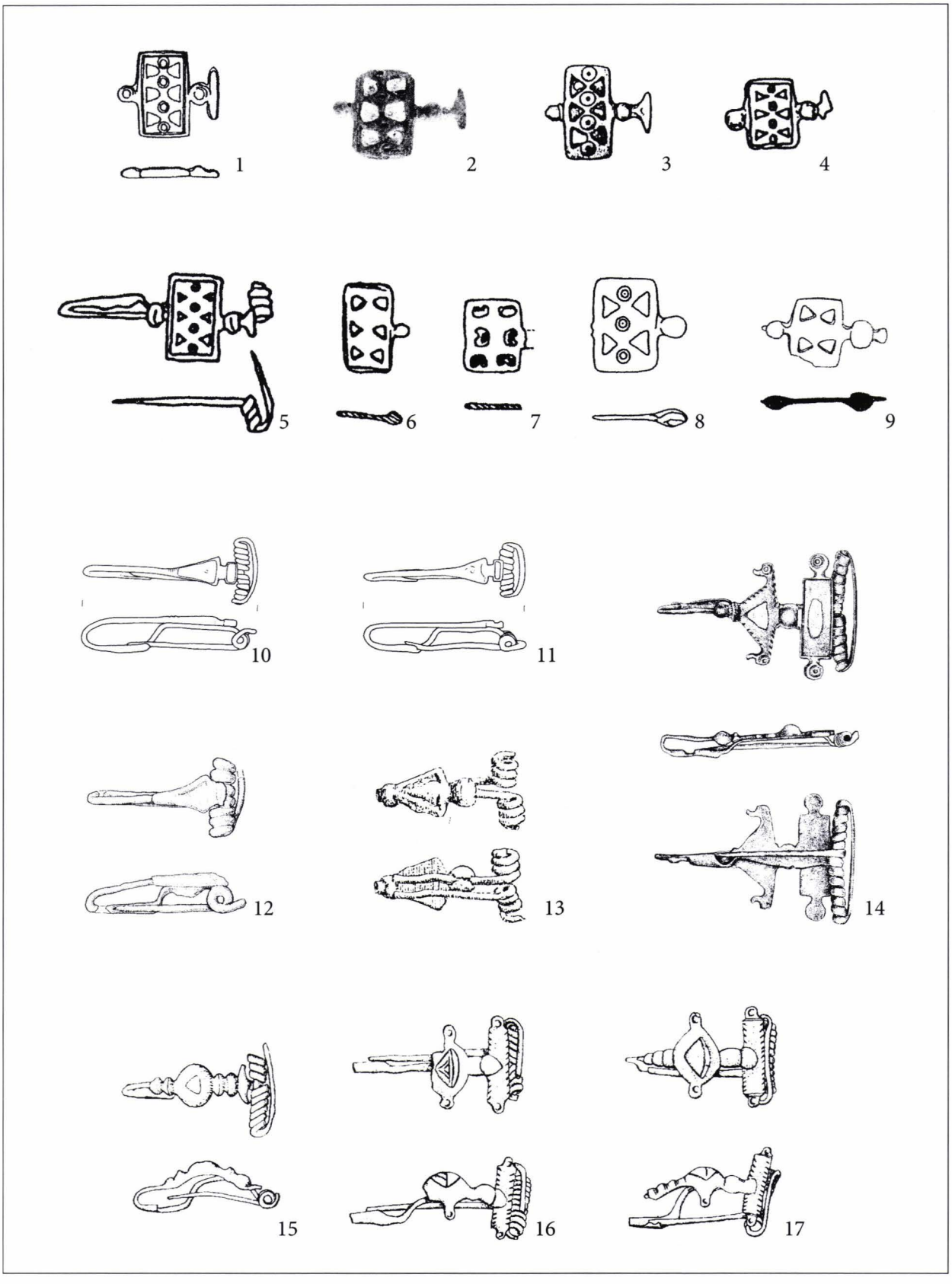

Plate 3. 1. Beli breg (after Tatić-Đurić 1970); 2. Veliki Vetren (after Stojić 2003); 3. Constanţa (after Rustoiu 1997); 4. Banat (after Rustoiu 1997); 5. Banat–Iron Gates (after Rustoiu 1997); 6–7. Mlava valley (after Stojić 2000); 8. Zemun (after Tatić-Đurić 1970); 9. Danube bank near Zemun (after Todorović 1971); 10. Zvonimirovo (after Dizdar 2013); 11. Novo Mesto (after Križ 2005); 12. Kapiteljska njiva; 13. Holiare (after Benadík 1957); 14. Gomolava (after Jovanović–Jovanović 1988); 15. Valična Vas (after Pavlin 2007); 16–17. Strmec nad Belo Cerkvo (after Pavlin 2007).

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On the Crossroads of Cultures. Cultural and Trade Connections of the Site of Szajk in South Transdanubia in the Sixth–Fourth Centuries BC

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Keywords: Late Hallstatt, Early La Tène, settlement, oinochoe, kantharos, graphite

During rescue excavations on the M60 motorway route in 2005, 2007, and 2008 four Iron Age sites were excavated near the village of Szajk in Southeast-Transdanubia, in the Hungarian Baranya region (site no. B105, B104, B073, B106). Located 12 km from Danube and 35 km from the Drava rivers (Pl. 1), the four sites seem to be the part of one large settlement complex that lies on three neighbouring hills divided by two streams.[1] 220 Iron Age features over an area of 6.7 ha were excavated during the rescue excavations. The majority of the features were remains of pit-houses in the form of shallow, rectangular or rounded rectangular pits with vertical sidewalls; and regular, round storage pits, but also there were some postholes indicating the existence of standing buildings (Pl. 1).

Owing to limitations of space questions concerning the lifespan and relative chronology of the Szajk Iron Age site complex cannot be discussed in detail.[2] As a brief summary it can be said that the earliest finds have Ha D characteristics, sometimes mixed with Early La Tène types of pottery. The analysis of the finds also indicates the sporadic presence of a LT B-C settlement phase. A strong distinction between the settlement features of the different chronological phases cannot be established. Neither does the settlement structure show a clear chronological pattern. However, there is a well-defined change in the pottery types following the Late Hallstatt/Early La Tène chronological boundary. The Middle La Tène pottery finds of the Szajk obviously lack local stylistic elements and have direct parallels in Central European material.

Unfortunately, metal finds are sparse at Szajk. The few fibulae can only serve as supporting material when attempting to establish site chronology. They consist of a fragment of a Certosa type, an Early La Tène pre-Duchcov (B1) example, and a Middle La Tène wire fibula that confirms the chronological framework showed by the analysis of the pottery material (Fig. 1).

The bulk of the Szajk find material fits into the so-called Srem Group defined by Croatian and Serbian research. As to our present knowledge, the Hungarian part of Baranya, i.e., the area south of the Mecsek Mountains can be regarded as the northernmost extension of the Srem Group. However, until now we only knew of cemeteries of the Srem Group, the main part of the material consisting of finds of unknown provenance.

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2 The whole chronological analysis of the settlement has not yet been completed; the results presented here are the author's preliminary observations.

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Fig. 1. Fibulae from the site.

Therefore the Szajk site is of paramount importance since a settlement clearly containing finds of the Srem Group has not been investigated in our area before. The closest analogies of the Szajk finds were found in the Beremend and Szentlőrinc Iron Age cemeteries. Excavation of these cemeteries indicated that a population of mixed burial rites with strong local traditions lived in the area in the sixth–fourth centuries BC. The typical La Tène material appears in significant quantities only in the third century BC.

The most characteristic finds of the Srem Group are the so-called *astragalus* type belts, Certosa fibulae, knives with curved blades, spearheads, glass bead necklaces, situlae, cowrie shells, and two-handled vessels (*kantharoi*). The group was first described by Garašanin (1973) who separated its material from that of the Bosut Culture. The earliest identified finds of the Srem Group were scattered finds of uncertain origin. The first well-documented assemblages are those from the burials found at Mošorin–*Stubarlija* (Serbia) and Vinkovci (Croatia) – although the Hungarian sites have been ignored by Serbian research.

As it has already been pointed out several times, the deficiencies of research are also indicated by the fact that material of the Srem Group is known almost exclusively from burials: Vinkovci (Majnarić-Pandžić 2003), Doroslovo (Brukner 1959), Mošorin (Medović 2002; 2007), Sremska Mitrovica (Brunšmid 1902), Beremend (Jerem 1973), Szentlőrinc (Jerem 1968), Šabac (Vasiljević 1976), as well as the recently discovered Szeged-Kiskundorozsma cemetery (Pilling–Ujvári 2012). Information on Srem Group settlements has been sparse and uncertain, and mostly has come from the sites of the Bosut culture like Petrovaradin (Medović–Hänsel 2006), Feudvar by Mošorin (Hänsel–Medović 1991) Gomolava by Hrtkovci (Tasić 1988) and Gradina by the Bosut River (Medović 1978). The settlement at Stari Mikanovci (Potrebica–Dizdar 2002) can also be ranked with the Srem Group. Filling the hiatus, the Szajk settlement complex has produced numerous finds, like the few Certosa fibula fragments and the kantharos type vessels with handles raised well above the rim, which correlate with those found in the above mentioned cemeteries.

Chronologically, the material of the Srem Group has been divided into two sub-groups: the sixth–fifth centuries BC early phase, and the fifth–fourth centuries BC late phase (Medović 2002, 105–106). The finds from the Beremend and Szentlőrinc cemeteries also fit into this chronological frame.

Several attempts have been made to explain the heterogeneity of the Srem Group. Its formation is often brought into connection with the fifth century BC appearance of the Scythian (Vekerzug) Culture in the area of Romania and Eastern Serbia that may have caused the termination of the Ferigile and Bosut Groups (Medović–Hänsel 2006, 492). This change also re-oriented the main direction of local trade networks towards the Eastern Alpine region. It was considered that ethnical changes in the population of the preceding, sixth century BC Bosut III culture also contributed to the genesis of the Srem Group, the local population and the immigrating Amantes and Breukoi together forming the new material culture (Popović 1981). R. Vasić (1987) also supposed the influx of new ethnic elements during the sixth–fifth centuries BC from the direction of Eastern Bosnia and Western Serbia, and found traces of direct influence from Dolenjsko area. However, Vasić did not notice any connection between the settlements of the Bosut Culture and the cemeteries of the Srem Group.

With the replacement of cremation with inhumation a distinct change can be observed in the burial rite in the late, sixth century BC phase of the Doroslovo cemetery of the Dalj Culture. Shortly after the appearance of 'Scythoid' motifs on grave goods the cemetery was given up already in the sixth century. The finds of the Doroslovo cemetery show that the Dalj Culture lasted up to the end of the sixth century when new elements came into view and there is a discontinuity between the cremation graves and the graves of the fifth–fourth centuries BC (Ljuština 2010, 60).

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During the Celtic period in the area comprising the present-day Baranya County (Hungary) and Slavonia (Croatia) the increase in the number of settlements and cemeteries became significant in the Middle La Tène period (from the LT B2, and more significantly in the LT C1 phase), though the sporadic presence of early, fourth century BC La Tène material can also be observed (Majnarić-Pandžić 1970; Božić 1981; Potrebica–Dizdar 2002; Maráz 2008; Szabó 2009; Dizdar 2011; etc.).

Aside from the complicacies of its chronology, the apparently multifaceted system of contacts of the population having lived at the Szajk site is also noteworthy, complexity illustrated by some of the most characteristic and/or unique types of the pottery.

Kantharoi

Kantharoi are one of the most common types of vessel in Szajk. Most of the surviving examples are fragments. In many cases only the presence of shoulder fragments with one or two stubs of the handle, or sherds of flat handles indicated the presence of kantharoi in the fill of certain features. Almost all of these vessels show traces of graphite painting with the fabric of the body being either brick-red or dark grey. The majority of them are of narrow shape with bi-conic body, usually with graphite painting, and shallow grooved decoration, fingertip impressions, or incised patterns at the belly (Fig. 2). Wheel-finishing of certain pieces cannot be excluded, but its traces cannot be discerned because of the burnished surface and graphite painting.

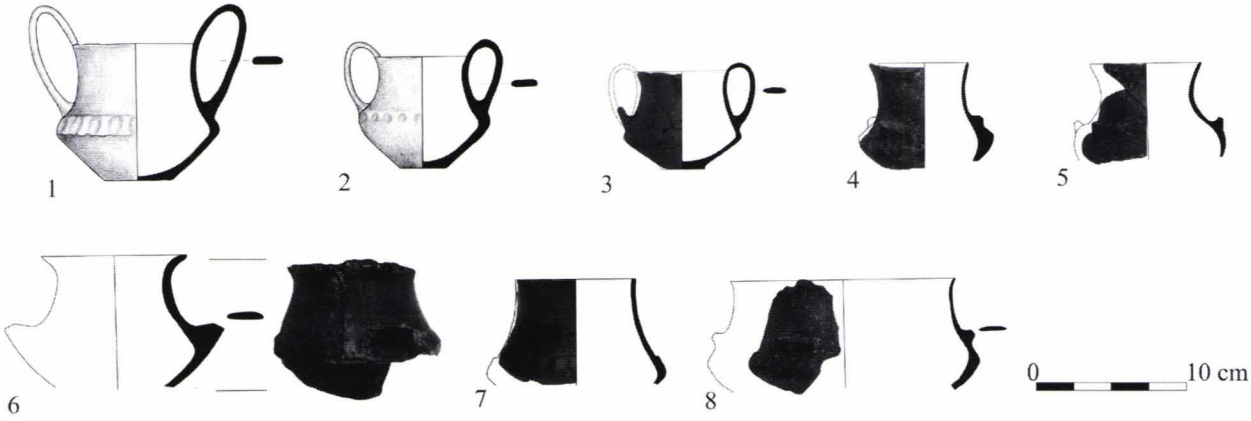

Fig. 2. Types of kantharoi from the site.

In the Classical tradition kantharoi were associated with the cult of Dionysos and served as cups for drinking wine (Rustoiu–Egri 2010), and as such, they can be associated with oinochoai. In Baranya County, Hungary double handled vessels had been a common type since the Late Bronze Age. The Szajk kantharoi are much narrower in shape and their handles are raised much more above the rim than those of the wide-bodied specimens of the Early Iron Age Dalj Culture. The Szajk kantharoi are also different from the La Tène and classical Hellenistic types both in terms of form and potting technique (Rustoiu–Egri 2010, 227–228). The kantharos types from Szajk were basic forms of the Srem Group, during the sixth–fourth centuries BC in the region in and around Baranya (Pl. 2/1). We may then call them 'Pannonian' kantharoi (for a summary about the form see Dizdar 2010).

Finds from the multi-period site of Pod in Bosnia show that the forms with curved neck and conic or bi-conic body (the type 5 following Gavranović) date to the latest phases of the site: they appear during the seventh–fourth centuries BC (Gavranović 2011a, 79–81). Also in Central Serbia there are a few examples from the sixth–fourth centuries BC of similar 'Pannonian' kantharoi, such as from the tumuli of Ljuljaci (Srejović 1990) or Pilatovići (Vasić 1977, pl. 21). The two northernmost analogies of the kantharoi found in Szajk were found near Neufeld in Austria. Based on the fibulae found with them, these kantharoi can be dated to the beginning of the La Tène period, to the fifth century BC (Jerem 1996, 103–105, pl. 7/5–6; 8/1). The examples of Neufeld were most probably imported, though the graphite tempering of one may indicate a local origin. The grave goods in the LT B2–C1 burials excavated at Zvonimirovo (Croatia), and Mahrevići (Bosnia), are examples of the survival of a distinctive local hand-made type of pottery. They indicate that the kantharos type remained in use until the

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Middle La Tène period in the region comprising the Hungarian Baranya, the Srem district and Eastern Slavonia (Dizdar 2010).

Oinochoai

The most remarkable, and at the same the most controversial pottery finds from the Szajk site are the jugs (oinochoai) with their spout formed by half of the neck vertically cut away (Fig. 3). At the bottom of pit no. 73/73 (Fig. 4), the fragments of ten oinochoai were found, of which six could be entirely restored (for the description of the jugs see: Gábor 2009). As a result of this lucky find we were able to identify oinochoai even on the basis of small rim sherds. The rest of the assemblage comprised small, but characteristically formed rim sherds and some graphite painted fragments perhaps of handles of triangular cross-section that could be identified as being parts of oinochoai on the basis of the restored pieces. The Szajk oinochoai were entirely covered by thick graphite slip that gives the surface a metallic appearance, a feature that seems to be the result of mixed influences from both the Balkans and the West. There is channelled decoration around their shoulder. They are likely to be hand-made, since rilling is not present on any of them (though rilling may as well have been removed by burnishing the surface). The majority of the Szajk oinochoai are 180–200 mm tall, but there are also some smaller ones. The rest of the material from the above-mentioned pit – urn fragments, bowls with inverted rim and graphite painted decoration – show Hallstatt traditions, which suggests a date in the second half of the sixth century or the beginning of the fifth century date (Pl. 3–4).

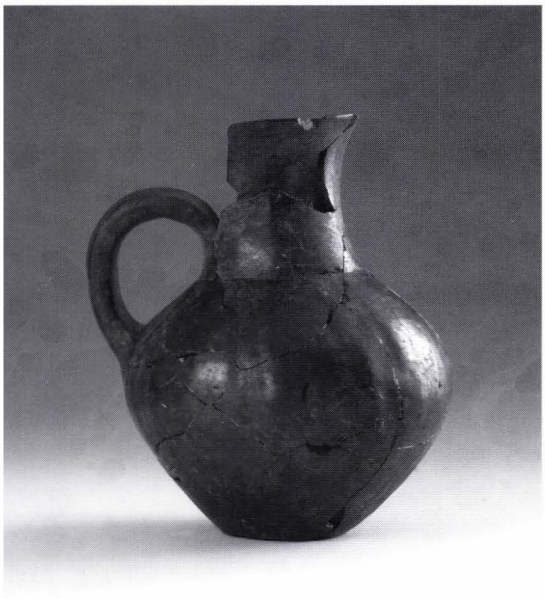

Fig. 3. Oinochoe from feature 73/73.

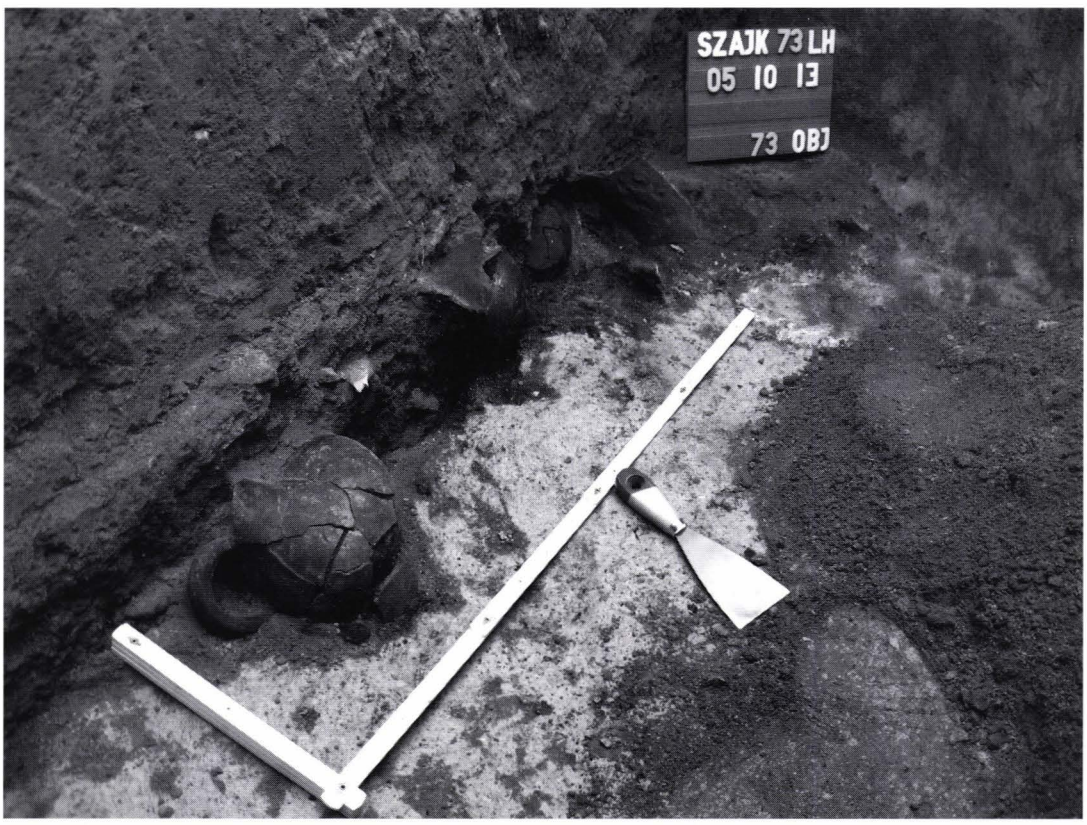

Fig. 4. The pit 73/73 with oinochoai on the bottom.

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The cut-away neck jugs are unusual in the Carpathian Basin. However, the multiple examples in the find material (found in fifteen features) of the Szajk settlement suggests that it was known for the population living there. This fact raises the question whether the appearance of the oinochoe type simply meant the adoption of the pottery form in itself, or it also meant the adoption of viticulture usually associated with oinochoai. The presence of the cut-away neck jugs at Szajk shifts its northern boundary of distribution from the formerly known burial in Pećine (for a detailed analysis of the form see: Parović-Pešikan 1988; 1993). Most probably a Greek import, the oinochoe from the Atenica (South Serbia) princely grave is dated to the sixth–fifth centuries BC (Djuknić–Jovanović 1966). The imported oinochoe found near Pećin can be dated to LT B or the late fourth century BC). A more accurate dating will only be possible on the basis of further published results (Jovanović 1985, fig. 5; Szabó 2006, 106).

Based on the stratigraphy of Kastanas, jugs with spouts have been present in Central Macedonia from the Bronze Age. These pitchers have two sub-groups, first are the so-called 'cut-away' jugs which do not have a distinct spout, and the neck does not have a direct connection with the handle, and secondly the pitchers with beak-like spout (whose spout is directly connected to the handle). In the Iron Age the previous group prevailed. The Szajk oinochoai resemble the Kastanas Type Ic that features a relatively long and curved spout. Type Ic is dated to a wide period, to 1000–400 BC. The Iron Age pieces of this type are markedly burnished and the majority of them is black (Hochstetter 1984, 51–58). Among the Kastanas jugs the ones found in Layers 2 and 3 (dated to 700–400 BC) have a spherical body similar to that of the Szajk jugs (Hochstetter 1984, 269–270, pl. 243/1.8).

In Southern Albania, pitchers had been a common type of vessel from the Late Bronze Age or thirteenth to twelfth centuries BC (Prendi 1982, pl. 8/15). In the seventh–sixth century BC they were often placed in tumuli. The analysis of the grave goods of the sixth–fifth century BC Borovëst cemetery demonstrates the long-term use of the type. The Borovës finds included both wheel-thrown and hand-made oinochoai. In one of the graves a small oinochoe was found together with an Illyrian helmet (Aliu 1994).

Small pitchers resembling the Szajk oinochoai were also found in some of the Romaja tumuli (Vasić 1977, pl. 41/15, 16; 42/20; 43/11) in Kosovo. The graves with these pitchers are dated to the end of the sixth or beginning of the fifth century BC, which is contemporary with the dating of the Szajk oinochoai. The Romaja site has been dated to phase III (550–450 BC) of the Iron Age, as it is also indicated by the Širokoi burials with similar jugs (Vasić 1977, pl. 15/17; 16/2; 19/21). Summarizing the above, the oinochoe type jugs were present in the Balkans from the Early Iron Age up to the fifth–fourth centuries BC. Current knowledge indicates that their presence north of the area of Macedonia and Albania is sporadic, and therefore these northern examples cannot be accurately dated. The connection between the area of South Serbia and Baranya is at the moment uncertain; future excavations in Serbia may fill the gap.

Decorated handles

In general, the stylised animal head decoration is typical of the Late Hallstatt and Early La Tène periods in the Carpathian Basin. Apart from some examples of the widespread types, the excavations at the Szajk produced handle decorations that mostly show local characteristics (Fig. 5). The relative chronology of the different variants found at Szajk is unclear since decorated handles in each feature belonged to either of the types; however, it seems that they were in use more-or-less contemporaneously.

A recent typology of the Late Hallstatt/Early La Tène horn-handled bowls defined 13 types of bowl and handle variations (Tankó 2005a). The typology of the handles from Szajk was created with regard to the above classification, but with minor modifications and additions, since the majority of the handle decorations survive only as fragments and therefore one can but make assumptions about the cups that they were parts of.

Type 1. Facing each other, two stylised, triangular animal-head decorations are positioned vertically near the upper end of the raised handle of the cups or bowls belonging to this group. Only partial reconstruction of the associated vessel forms could be attempted since the surviving examples without exception are fragments of handle, occasionally with a small part of the body. Some of the fragments suggest that they may have been attached to a cup with flattened body and strongly carinated shoulder. All these handles are made of a fine fabric and are graphite painted. Though this type does not appear in earlier classifications, in our opinion the differences in profile of this group from Type 3 noted below allow for a distinction to be made. Close analogies of the Szajk type 1 handle decoration can be found

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in the find material of the Beremend cemetery (Jerem 1973, pl. 8/21; type Be by Tankó 2005a). A similarly formed animal head-decorated fragment was also recovered from the Szentlőrinc cemetery (Jerem 1968, fig. 26/3), but this fragment is more likely to have been a decoration applied to the body of a vessel. There are only a few analogies (Pl. 2/2) to this type from the Late Hallstatt period in Northern Croatia (Majnarić-Pandžić 1986, pl. 13; Kovačević 2008, pl. 8/2) and in Doroslovo (Trajković 2008, grave 61) and possibly the example from Židovar in the Banat (Jevtić–Sladić 1999, pl. 1/8). So this type seems to be a local form in Slavonia and eastern Srem in the Late Hallstatt period.

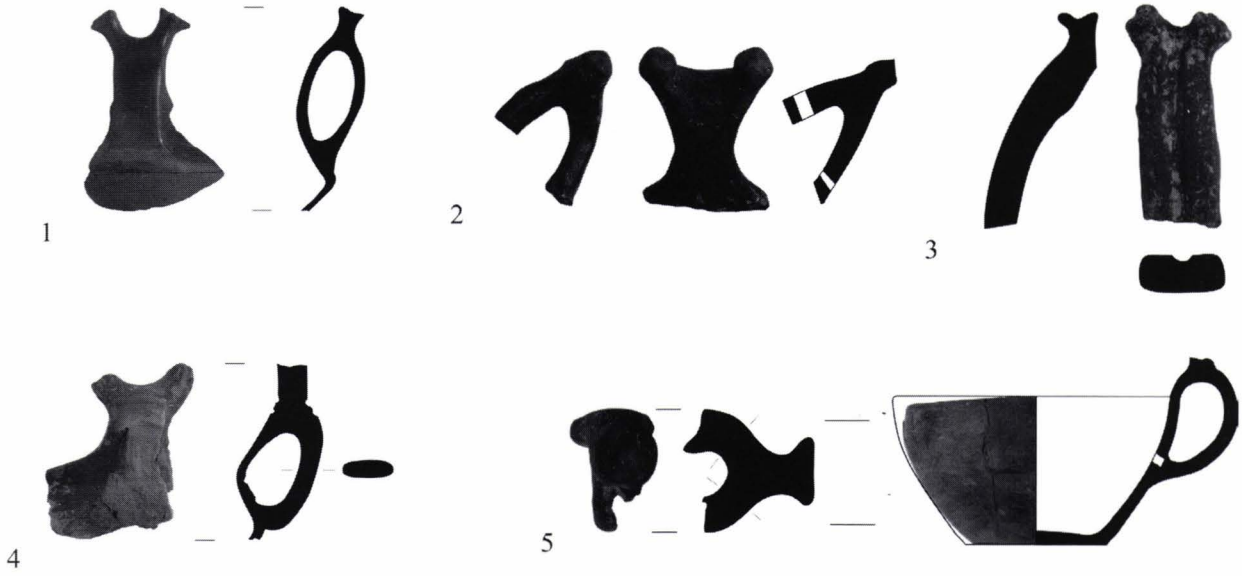

Fig. 5. Decorated handles from the site (different scales).

Type 2. Located on the curved top of a raised strap handle fragment, there is a single example at Szajk for a vertical horn decoration with pointed, more-or-less bi-conic tip (Type C of Tankó 2005a). Unfortunately, the form of the vessel cannot be determined, but it can be assumed that it belonged to a flat conic bowl. Similar horn decorations have been found along the Danube in the northern part of Hungary. The piece found near the village of Szob was recovered from a grave dated to the Scythian period (Ilon 1985), the Pilismarót–*Szobi-rév* example came from a Ha D settlement (Wollák 1979).

Type 3. In this case three small knobs on the two edges of the handle serve as decoration (Type e of Tankó 2005a).This widespread type might be considered as the precursor or a variant of type 1. Mostly it was also found in Slovenia, Bosnia, but also there are some pieces in southern Slovakia, such as Bučany (Bujna–Romsauer 1983, pl. 2/10), Nitra–Mikov (Romsauer 1993, pl. 5/4) from the Late Hallstatt period. The vessels of the type from Donja Dolina were dated to the sixth century (Marić 1964), while those from Layer IV of the Bosnian Pod tell were found together with early La Tène fibulae (Gavranović 2011b, 105). In grave no. 48/104 at Stična a cup with type 3 decoration was unearthed with an early phase Negau-type helmet that date to the beginning of the fifth century (Gabrovec 2006, Taf. 62). In grave 14 of the Sanski Most cemetery a type 3 horn-handled cup was found together with a Certosa fibula with animal head decoration (Fiala 1899, fig. 23).

Type 4. As a part of a wheel-thrown bowl, only a single fragment of the 'classic' La Tène horned handle (the Type D of Tankó 2005a) was found in Szajk. Analogous finds were recovered among others from the Pilismarót–*Basaharc* site (Bognár-Kutzián 1975, pl. II) and the Bučany cemetery (Bujna–Romsauer 1983, Taf. IV/18; VIII/1). The type has been dated with certainty to the LT A phase in the fifth–fourth centuries BC (Hunyady 1944, 17–19; Tankó 2005a). The type 4 decoration was applied to wheel-thrown bowls. The distribution area of this kind of bowl and handles is northern Transdanubia partly along the Danube (Tankó 2005a, fig. 7).

Type 5. Several handle fragments decorated with flat discs at the top have come to light in Szajk. Such handles had been certainly common in Baranya from the Early Iron Age – as for example is demonstrated, by the unpublished Pécs–*Jakab-hegy* material. As the fractured surface of one of the Szajk bowls shows, the disc decorations are likely to have been placed on the upper tip of handles of deep,

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conic bowls, similar to those reconstructed on the basis of the analogous finds from Vinkovci and Stari Mikanovci (Potrebica–Dizdar 2002, pl. 1/8; 4/6). The broken-off handle decoration of a cup from grave 20 of the Szentlőrinc cemetery is also likely to have been a Type 5 knob (Jerem 1968, fig. 22/20). A similar, knob-decorated fragment was found at Donja Dolina, dated to Phase IIc, or to the period between 500 and 300 BC (Marić 1964, pl. XVI/3). There are distinctive knob-decorated handles in the Ferigile cemetery (Vulpe 1967). According to the chronological system devised for the Romanian site, hemispherical bowls with disc-decorated handles were generally used as grave goods until Phase 4, or the sixth century BC (Vulpe 1977). In general, the Type 5 handle decoration has the most widespread use in the Late Hallstatt Ferigile cultural group. However, the geographical distance and the various other cultural groups between Szajk and the Ferigile area makes the direct connection between the two cultural entities doubtful at the moment. Since the unpublished material in Baranya County from the Early Iron Age comprises numerous examples of the type, we can regard it as a local development.

Stamped bowls

There are several examples of wheel-thrown bowls and urns with stamped decoration at Szajk. These stamped motifs – concentric circles, reversed 'S' motifs, pendant motifs – are characteristic of the early stamped decoration style of the eastern Celtic territories (Schwappach 1979, for a summary see: Tappert 2006, 189–194).

One frequently used vessel during the Early La Tène Period in the Eastern Alps was the so-called *Braubach* bowl. Bowls of this type are usually S-profiled, and have stamped motifs near the bottom on the inside. The decoration usually consists of a star-like formation of stamped circles arranged in triangles. The omphalos shaping of the bottom is also quite common. Unfortunately, the majority of the *Braubach* bowls from Szajk are so fragmented that entire decorations are not possible to reconstruct (Fig. 6).

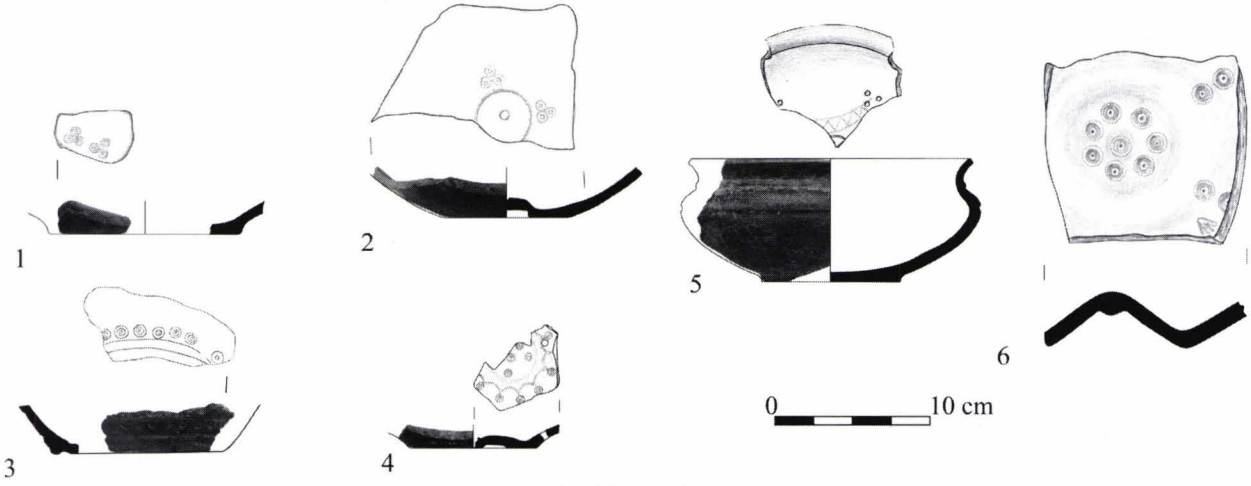

Fig. 6. *Braubach* bowls from the site.

Braubach bowls were defined and classified more than half a century ago (Dehn 1951). The earliest, LT A examples of this type of bowls are primarily found in the western part of the Czech Republic and in the Salzburg area in Austria. The place of origin of these bowls was considered the area around the Dürrnberg, where the Hallstatt precursor of the type can also be found. Decorated with rosettes and girland motifs, one of the fifth century Dürrnberg bowls indicates that the decoration of the Braubach type may also derive from Attica (Stöllner 1996, 228–229). These bowls are common in the Early Celtic cemeteries and settlements of the LT A2–B1 in the eastern alpine territory, e.g. Au an der Leitha (Nebehay 1973, pl. IX/1; XV; XIX), Lepoldau (Nebehay 1991, pl. 18/2, 9; 23/1, 5; 24/1); Mannersdorf (Ramsl 2011 pl. 34/23; 46/1–2; 156/1; 234) or Bratislava-Dúbravka (Stegmann-Rajtár 1996, pl. 11/2). There are some examples in Sopron (Jerem 1980, pl. 16/3; 18/4, 5) and in Bučany (Bujna–Romsauer 1983, fig. 27). The bowl form Pilismarót (Bognár-Kutzián 1975, pl. II) can also be connected to the group.

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Graphitic wares

Graphite was used in some forms throughout the existence of the Szajk settlement frequently for decorating fine wares – bowls, cups, kantharoi, urns –, either as slip applied on the entire surface of the vessel, or for painting motifs on the inside or outside of some vessels. The motifs mostly appear as cross-hatch or chessboard patterns, and triangles (Pl. 5). The use of graphite painting can be regarded as a Hallstatt tradition. To the south of Hungary (Bosnia, Croatia, Serbia) the use of graphite seldom occurs.

Bowls decorated on the inside with cross-hatched and triangular motifs mostly executed with graphite are usual in Bavaria, south Germany, Austria, Moravia, and western Transdanubia from the Ha D period (Brosseder 2004, 286–287); also in the Early La Tène period graphite painting is usual in the settlements of the Eastern Alpine region. So in the Late Hallstatt period of Transdanubia graphite-coating and painting became frequently used, with examples from Csönge (Fekete 1984), Szob (Ilon 1985), Pilismarót (Wollák 1979) and Tokod (Patek 1983). Although researched has not always clearly distinguished between the motifs made by burnishing and those with graphite painting, it is worth mentioning that in Szajk graphite painting/burnishing was clearly predominant while simple burnishing was seldom used. East of the Danube instead of graphite painting burnished decorations are present among the finds from the sites of the Great Hungarian Plain from the second half of the sixth century BC, but they are definitely rare (Kemenczei 2009, 101).

In some cases graphite painted decoration appears on the outside of larger vessels from Szajk as meander, linear, cross-hatched, and chessboard patterns but because many of the motifs survive only on sherds, we cannot securely link them to certain types of vessels. In a few pits from Szajk early-type sherds with graphite tempering were found (Fig. 7) which may be fragments of early situlae (Kappel 1969, 51–52). Regarding their form, they fit into the types characteristic for the site, but their material is different. The nearest examples of early pottery types with graphite tempering have been found on the group of sites around Sopron (Jerem–Kardos 1985).

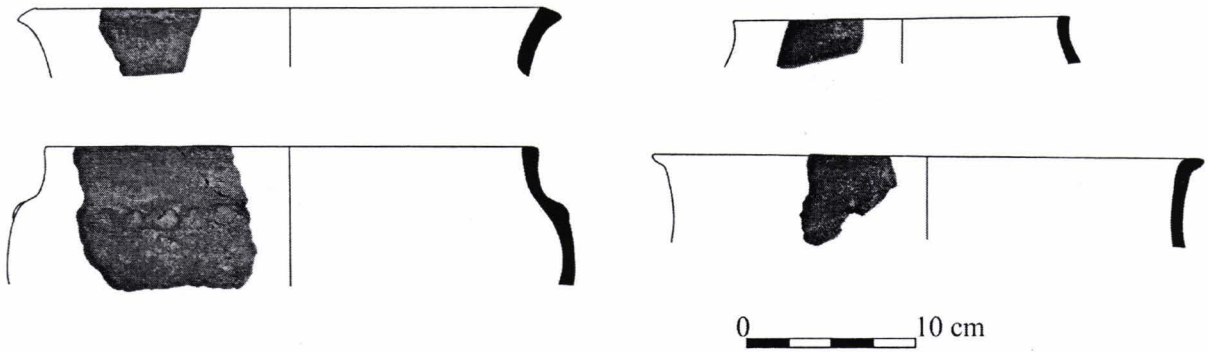

Fig. 7. Fragments of Early La Tène graphite wares.

Graphite tempered pots with thickened rim and vertically brushed belly are rare in Szajk. Earlier literature dated this type to the Middle La Tène period (Hunyady 1944, 141; Kappel 1969, 53). Newer data suggest that it was already present in LT B (Jerem–Kardos 1985) at Ménfőcsanak (Tankó 2005b), with some occurrences as early as LT A (Bujna–Romsauer 1983, pl. VI/3). In any case, this type of pot was most common in the Carpathian Basin during the Middle La Tène phase.

Since there are no natural graphite deposits anywhere near the Szajk settlement, it was imported, the most probable sources being those in Austria and the Czech Republic. The fact that graphite was used throughout the lifespan of the settlement suggests more-or-less uninterrupted trade relations between the Szajk site and the above-mentioned areas. It is generally accepted that graphite ore itself was traded, and not finished graphite-tempered or graphite painted ware (Rustoiu 1993, 141; Sievers 2006, 73). Archaeometric examination of the Dunaszentgyörgy finds show that the graphite-tempered vessels were locally made, just like the rest of the pottery recovered from the site (Szöllősi *et al.* 2009) Examination of the material found in Szajk shows that the source of the graphite was in the southern part of the Czech Republic (Havancsák *et al.* 2009).

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An interesting example was recovered from feature no. 105/290 at Szajk: regarding its form it is identical with the early-type Middle La Tène situlae, but its material is not tempered with graphite (Fig. 8). However, the fact that it is graphite-painted that can be a remnant of earlier traditions.

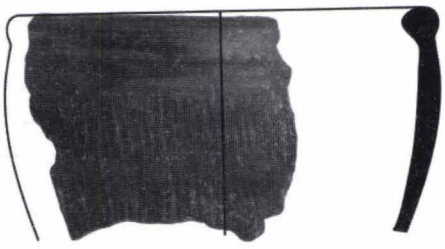

Fig. 8. Situla from the feature 105/290, with graphite-painted exterior surface.

The network of relations of the Szajk site in chronological order

Phase 1 (Pl. 3–4, 6)

In the early phase of the settlement Hallstatt traditions prevailed (such as urns with cross-hatched triangle decoration, graphite painted bowls with inverted rim, etc.). In addition, there are elements (kantharoi, decorated handles, Certosa fibula) whose characteristics point towards Slavonia, the Srem district, and towards Glasinac in Bosnia. It is likely therefore that Szajk had strong cultural ties with these territories.

Although the presence of the biconical decorated (*type 2*) handles at Szajk indicates that the site had connections to the main Danubian trade route, the bowls with graphite painted decorations and the frequent use of graphite coating of fine ware link the settlement to the Eastern Alpine *Hallstattkultur*.

When dealing with the Late Hallstatt / Early La Tène period it is always an important question to decide what can be considered as imported goods and what as locally made products. With no doubt kantharoi were locally made since they are present in the assemblages of almost all the excavated features. It is a more difficult question to evaluate the role of decorated handles. Vessels having handles with triangular ending (*type 1*), or handles with disc decoration (*type 5*) are likely to have been produced locally, since they were found is several objects, while other types with only one example are more probably imported.

The presence of oinochoai (cut-away neck jugs) is an even more interesting problem. Though the Szajk oinochoai have their closest formal analogies along the lower course of the Vardar River it is unlikely that they were imported since the surface technique applied to them (graphite slip) relates them to the other, local forms of the Szajk site. Additionally, the oinochoai were found in several of the excavation features which also implies a local origin. It is probable that migrant craftsmen or a family involved in pottery craft had a role in bringing in the technique and the oinochoe form. Their temporary presence could explain the fact that though we have numerous oinochoai, they still cannot be regarded as a common type at Szajk. Since several anthropological studies demonstrate that potters are mostly women in the traditional societies (Knopf 2002, 238), it is also possible that the pottery type appeared as one or more women moved to Szajk as a result of exogamy. We can also suppose that the appearance and use of the oinochoe type at lest partially had its roots in local customs.

Some examples of the characteristic 'Pannonian' kantharoi in Central-Serbia may also offer proof of the contacts between Baranya and the Middle-Balkan. As it has already been pointed out by others, Macedonia had a very important role in transferring Greek goods towards the north in the fourth–third centuries BC. The fifth–third century BC period of the Kale-Krševica site at the lower course of the Morava River in South Serbia is a good example for the existence of this important trade route that ended at Pećine in the north (Rustiou–Egri 2011, 36–37, fig. 25). We cannot exclude the possibility that this trade route already existed in the sixth century BC.

Phase 2 (Pl. 7)

In the middle chronological horizon of the Szajk settlement there are examples of Early La Tène style vessels like Braubach bowls, stamped vessels, S-profile bowls, horn-handled vessels (*type 4*), and early type graphite tempered wares. These vessels differ from the locally produced ones both in terms of technique and decoration, and therefore they are likely to have been imported. Apart from a few possibly imported pieces, the local forms (mostly comprising pots) prevailed during the existence of the Szajk settlement. However, the above described special wares may serve as markers in the chronology of the site.

When considering the possible routes along which the imported wares arrived at Szajk, the role of rivers has to be emphasized. The distribution of *type 1* decorated handles in phase 1 indicates that the Danube was an important trade route already at that time. Most probably originating from the south

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Transdanubian area, the kantharoi found near Neufeld shed light on the mutuality of this contact. It is also quite probable that new sites with evidence of early La Tène characteristics will be discovered along the Danube – the graves at Paks–*Gyapa* dated to LT B1 may be indicative of this phenomenon (Tankó 2012).

Phase 3 (Pl. 8–9)

In the Middle La Tène period of the Szajk site entirely new forms and new production techniques were introduced. Wheel-thrown types became generally used, like situlae, and pots with thick lip, bowls with S-profile. These forms fit into the general types of the LT B2–C1 phases. Since in this phase a uniformity of forms can be observed on throughout Central European, the find material is not of much help when trying to identify contact networks. We can only suppose that the contacts towards the Slavonia Srem area were kept alive. The graphite-tempered vessels dated to Phase 3, on the other hand, prove that the relations were kept up with the above mentioned areas far to the northeast of the site.

***

Although the settlement complex of Szajk lies at the meeting point of three cultural spheres, its material on its own is quite uniform. Three factors make the interpretation of the material difficult: all the finds were recovered from a settlement context; there is an almost total lack of finds other than pottery; and finally, we have no material from or even knowledge of any other settlements from the Late Hallstatt / Early La Tène period from the broader area around Szajk. It is difficult to distinguish the imported and locally produced wares in the find material of the Szajk settlement complex. However, based on a few pottery types with analogies in Slavonia, the Srem district, Bosnia, and Slovenia, it seems probable that the settlement had relations with these regions. The formerly excavated material of the Beremend and Szentlőrinc cemeteries already showed signs of a strong influence from the West Balkans. It is also likely that relations were maintained with the Eastern Alpine region either by migrating craftsmen, or exogamy, or through market-places. It is also noticeable that the routes along the rivers Danube, Drava, Sava, Vardar, and Morava had a significant role in the supposed contact network of the settlement. It cannot be a coincidence that the spreading of Early La Tène goods (like pre-Duchcov and Duchcov-Münsingen fibulae) followed the same riverine routes (Rustoiu 2012, fig. 1; Ljuština–Spasić 2012, fig. 3).

The presence of the LT B2/C1 horizon at Szajk poses interesting questions. Apart from a few types of pots, the pottery forms used at the site undergo a significant change in this phase. It still not clear whether the site was continuously inhabited, or there was a period of abandonment following the Late Hallstatt/Early La Tène phases. Such a drastic change in the types of pottery could be caused in the first instance by the immigration of a new population, but also through the change in the local or broader economic trends and the change of the supply or the demand have to be considered (Knopf 2002, 240–245).

In agreement with the observations of Rustiou we also have found that latènization in the Carpathian Basin happened in several steps. It started with the establishment of long-range trade relations between the Eastern Alpine La Tène communities and the local population. Gradually, these ties became stronger both politically and economically. This was the period when the influx of greater quantities of La Tène style goods began. Finally, with the influx of goods migrants and settlers also appeared who mixed with the local population, thus forming new communities (Rustoiu 2012, 367–369). The material of Szajk can be interpreted as an imprint of the above described process.

Since there is a chain of LT B2 cemeteries along the southern stream of Danube – such as Karaburma, Pećine and Batina (Rustoiu 2012, fig. 3.) –, it can be possible that the new population and the new markets with them followed this route from south to north along the Danube and reached the territory of Baranya from this direction and not from the north, and herewith the former cultural connections of the Srem Group were not abandoned.[3]

3 This paper was translated by Gábor Bertók.

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Appendix 1

'Pannonian' kantharoi in the sixth–third centuries BC (Pl. 2/1)

1. Vinkovci, Croatia (Majnarić-Pandžić 2003, fig. 5/1; Medović–Hänsel 2006, pl. VIII/1, 4)
2. A. Mošorin–*Stubarlija*, Serbia (Medović 2002, fig. 4; Medović–Häsel 2006, pl. IX/12; X/4; Medović 2007, fig. 10/12, sl. 11/4)

   B. Mošorin–*Feudvar*; Serbia (Medović–Hänsel 2006, pl. XI/1)
3. Neufeld an der Leitha, Ausztria (Jerem 1996, 103–105, fig. 7/5–6; 8/1)
4. Pod, Bosnia (Gavranović 2011a, fig. 73)
5. Debelo Brdo, Bosnia (Gavranović 2011b, fig. 29/2, 3)
6. Donja Dolina, Bosnia (Marić 1964, pl. XVIII)
7. Szentlőrinc, Hungary (Jerem 1968, 188, fig. 20, 13/1; 22, 21–21/3; pl. XLIV/1, 3)
8. Zvonimirovo, Croatia (Dizdar 2010, pl. 1)
9. Osijek, Croatia (Spajić 1962, pl. XXVI/44)
10. Stari Mikanovci, Croatia (Potrebica–Dizdar 2002, pl. 1/8)
11. Šabac, Serbia (Vasiljević 1976, fig. 4/3)
12. Petrovaradin, Serbia (Medović–Hänsel 2006, pl. XIV/1, 2)
13. Ljuljaci, Serbia (Srejović 1990, pl. 2/1)
14. Pilatovići, Serbia (Vasić 1977, pl. 27/20)
15. Szajk, Hungary

Appendix 2

Handle types 1, 2 and 5 in the Carpathian Basin (Pl. 2/2)

Type 1

1. Varaždin, Croatia (Kovačević 2008, pl. 8/2)
2. Doroslovo, Serbia (Trajković 2008, grave 64)
3. Klinac, Slovenia (Majnarić-Pandžić 1986, fig. 13)
4. Beremend, Hungary (Jerem 1973, fig. 8/21)
5. Szentlőrinc, Hungary (Jerem 1968, fig. 26/3)
6. Židovar, Serbia (Jevtić–Sladić 1999, pl. 1/8)
7. Szajk, Hungary

Type 2

1. Pilismarót–*Szobi-rév*, Hungary (Wollák 1979, pl. 14/2)
2. Szob–*Gregsen-kert*, Hungary (Ilon 1985, pl. 4)
3. Tokod, Hungary (Patek 1984, pl. 18/2)
4. Visegrád, Hungary (Gróh 1984, pl. 6/16–17)
5. Szajk, Hungary

Type 5

1. Donja Dolina, Bosnia (Marić 1964, pl. XVIII)
2. Vinkovci, Croatia (Potrebica–Dizdar 2002, T.1/8; T.5/8)
3. Stari Mikanovci, Croatia (Potrebica–Dizdar 2002, pl. 4/66.)
4. Szajk, Hungary

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List of figures

Fig. 1. Fibulae from the site.
Fig. 2. Types of kantharoi from the site.
Fig. 3. Oinochoe from feature 73/73.
Fig. 4. The pit 73/73 with oinochoai on the bottom.
Fig. 5. Decorated handles from the site (different scales).
Fig. 6. *Braubach* bowls from the site.
Fig. 7. Fragments of Early La Tène graphite wares.
Fig. 8. Situla from the feature 105/290, with graphite-painted exterior surface.

List of plates

Pl. 1. Location of the site and some typical features.
Pl. 2. 1. Distribution map of the 'Pannonian' kantharoi in the sixth–third centuries BC (see Appendix 1); 2. Distribution map of some handle type in the Carpathian Basin Type 1 –triangles; Type 2 – squares; Type 5 – circles (see Appendix 2).
Pl. 3. Finds from the pit 73/73 with the oinochoai.
Pl. 4. Finds from the pit 73/73 with the oinochoai.
Pl. 5. Examples for graphite painted decorations (different scales).
Pl. 6. Finds from the features (pit-house) 105/163 – early phase of the settlement.
Pl. 7. 1–20. Finds from the feature (pit-house) 73/132; 27–37. Finds from the feature (pit-house) 73/133 – middle phase of the settlement.
Pl. 8. Finds from the feature (possible pit-house) 106/55 – late phase of the settlement.
Pl. 9. Finds from the feature (pit-house) 73/136 – late phase of the settlement.

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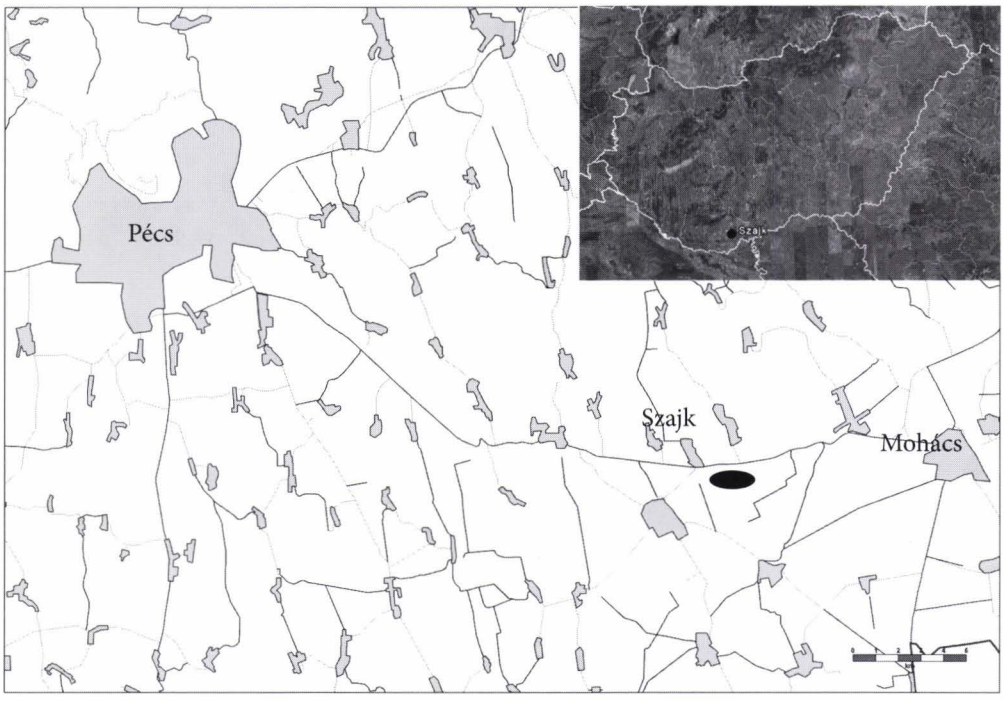

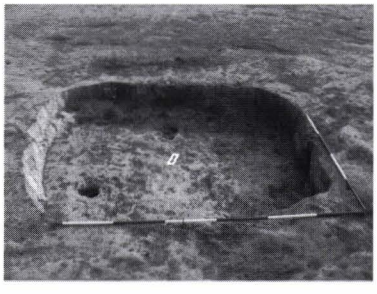

Plate 1. Location of the site and some typical features.

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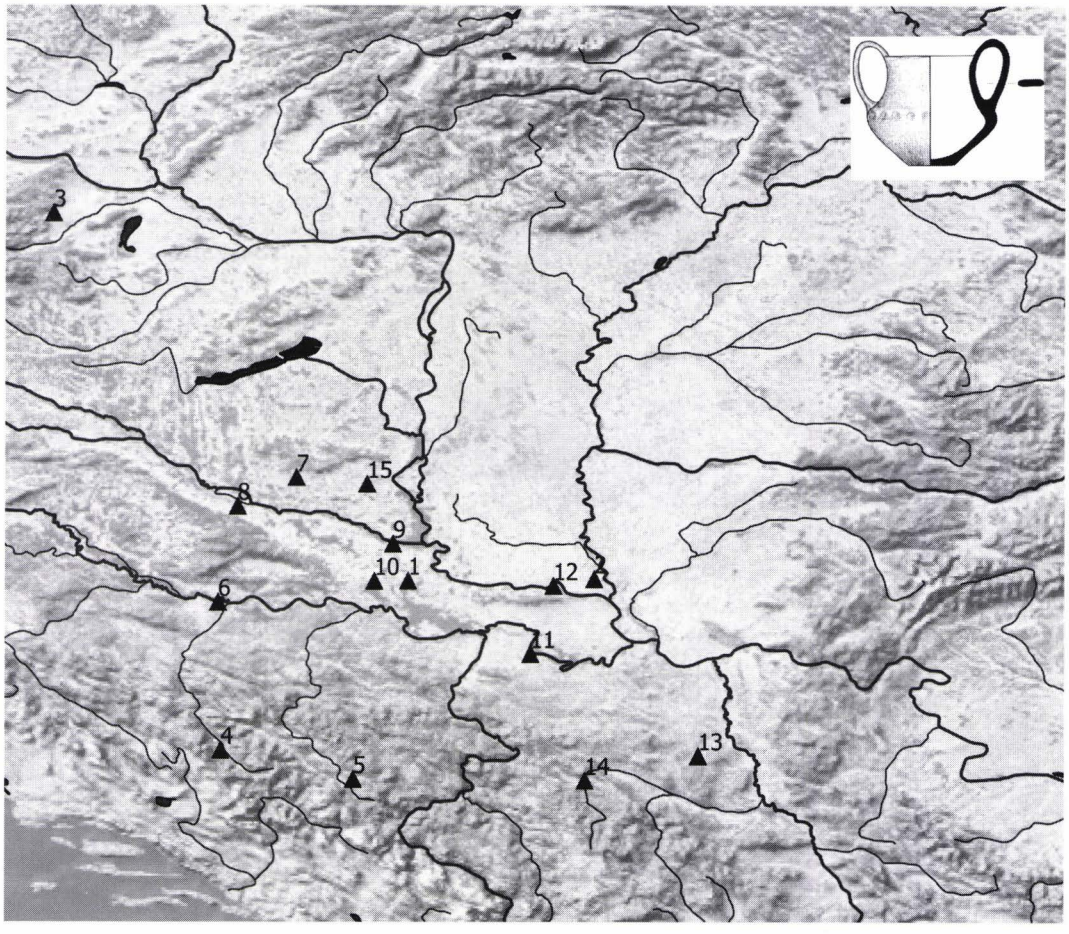

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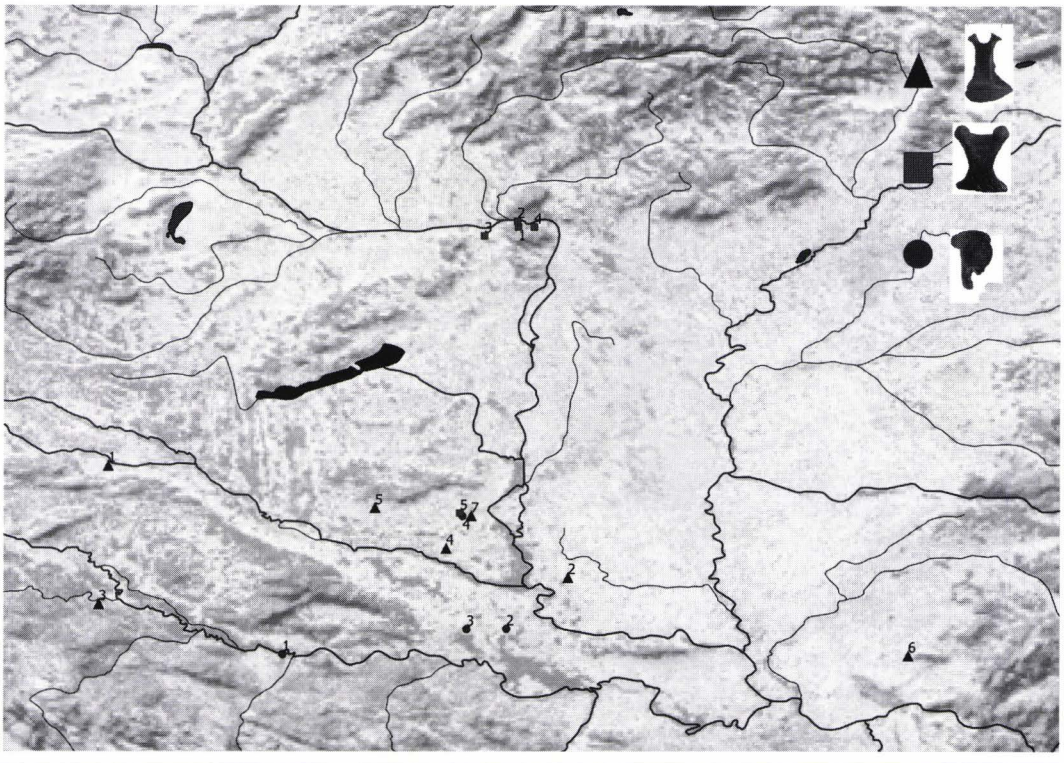

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Plate 2. 1. Distribution map of the 'Pannonian' kantharoi in the sixth–third centuries BC (see Appendix 1);
2. Distribution map of some handle types in the Carpathian Basin.
Type 1 –triangles; Type 2 – squares; Type 5 – circles (see Appendix 2).

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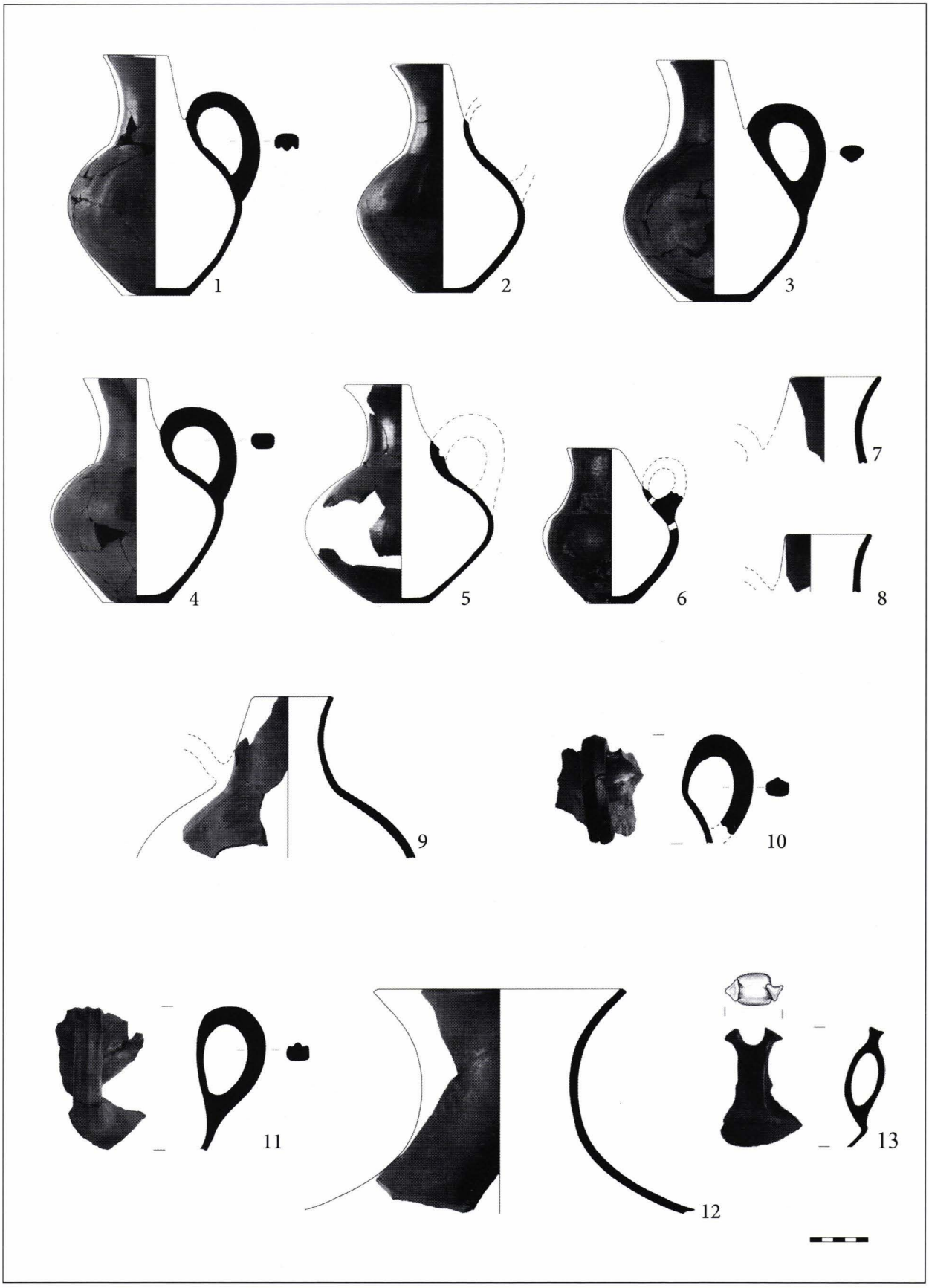

Plate 3. Finds from the pit 73/73 with the oinochoai.

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Plate 4. Finds from the pit 73/73.

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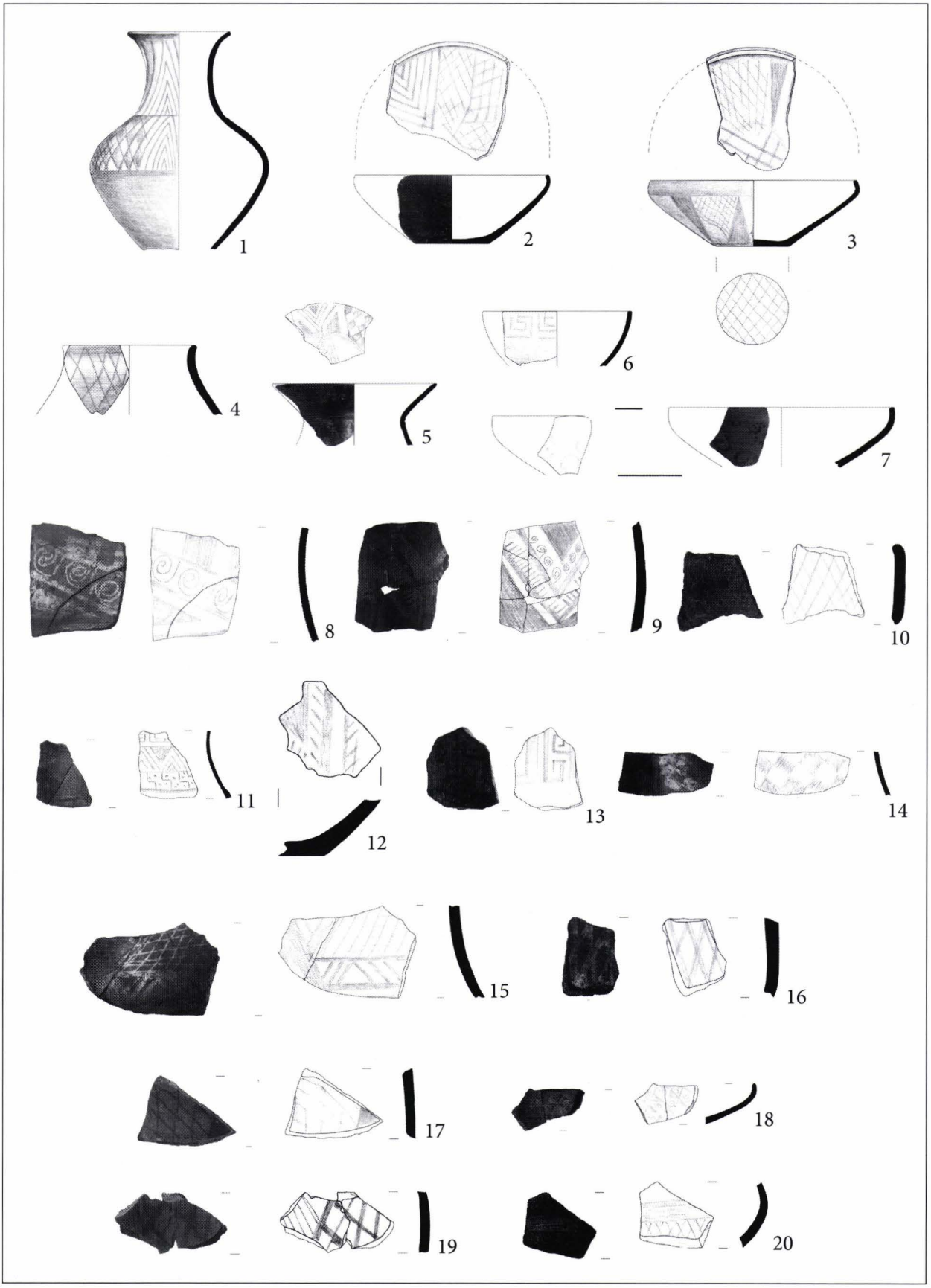

Plate 5. Examples for graphite painted decorations (different scales).

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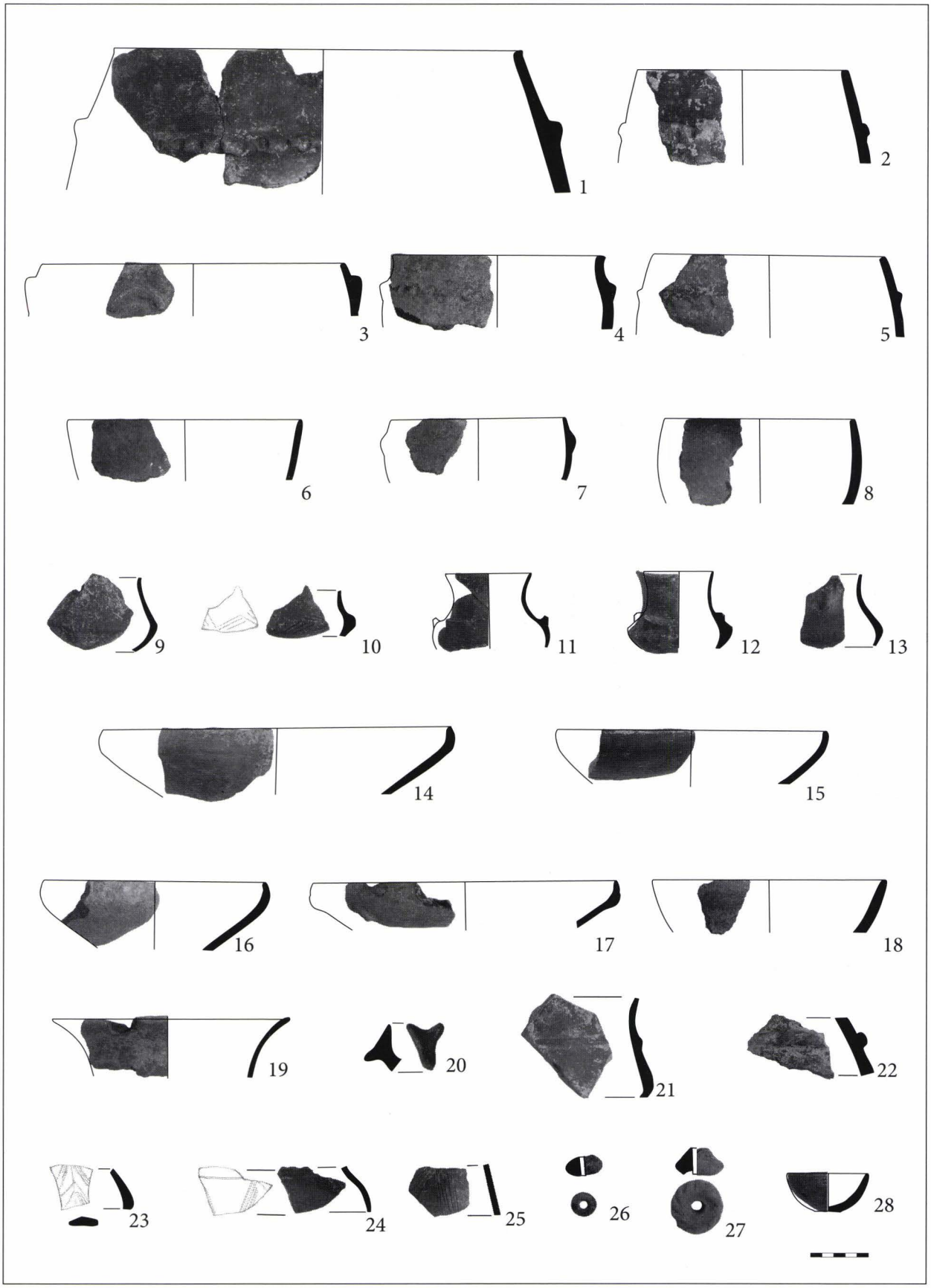

Plate 6. Finds from the features (pit-house) 105/163 – early phase of the settlement.

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Plate 7. 1–20. Finds from the feature (pit-house) 73/132;
27–37. Finds from the feature (pit-house) 73/133 – middle phase of the settlement.

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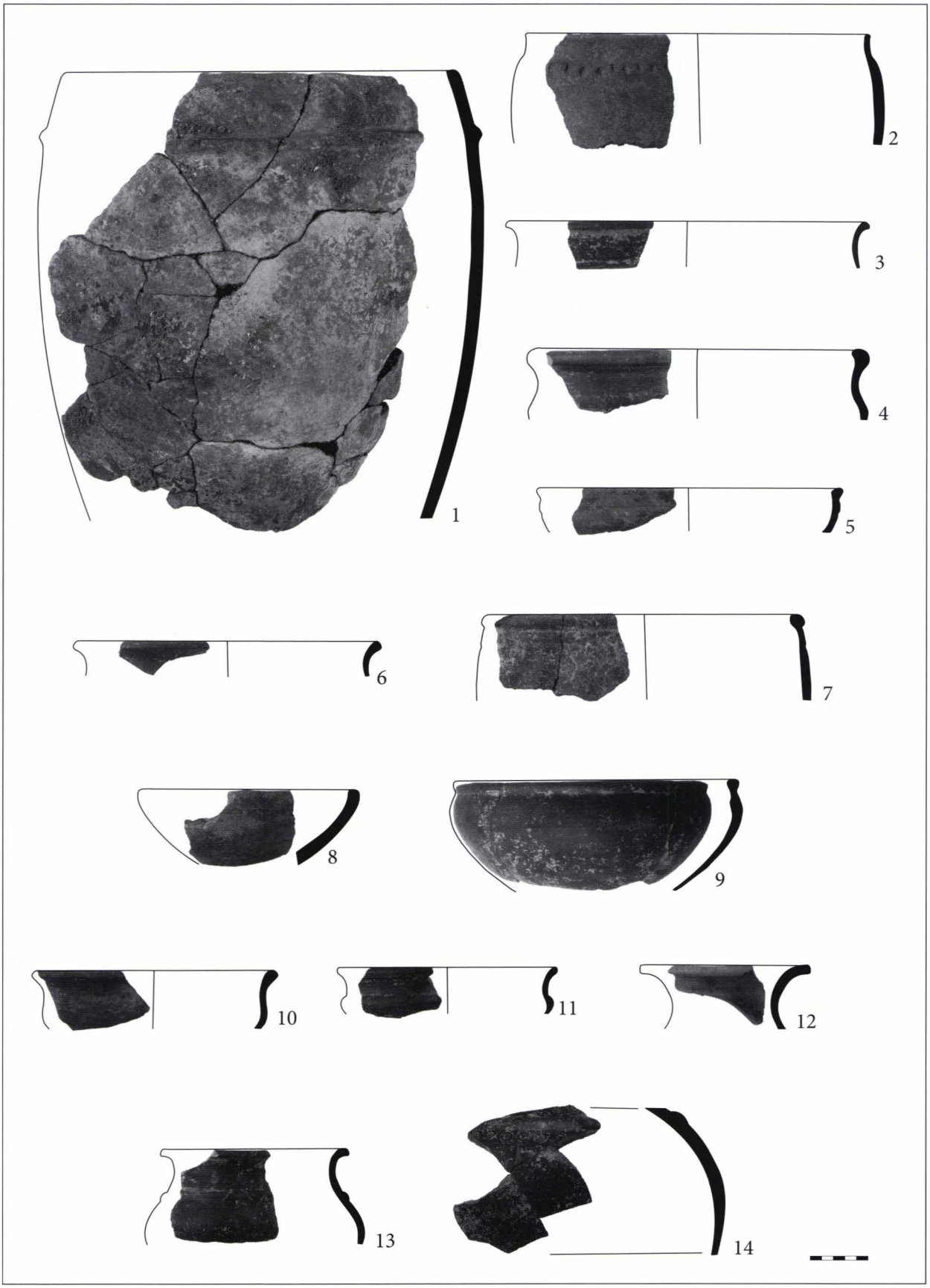

Plate 8. Finds from the feature (possible pit-house) 106/55 – late phase of the settlement.

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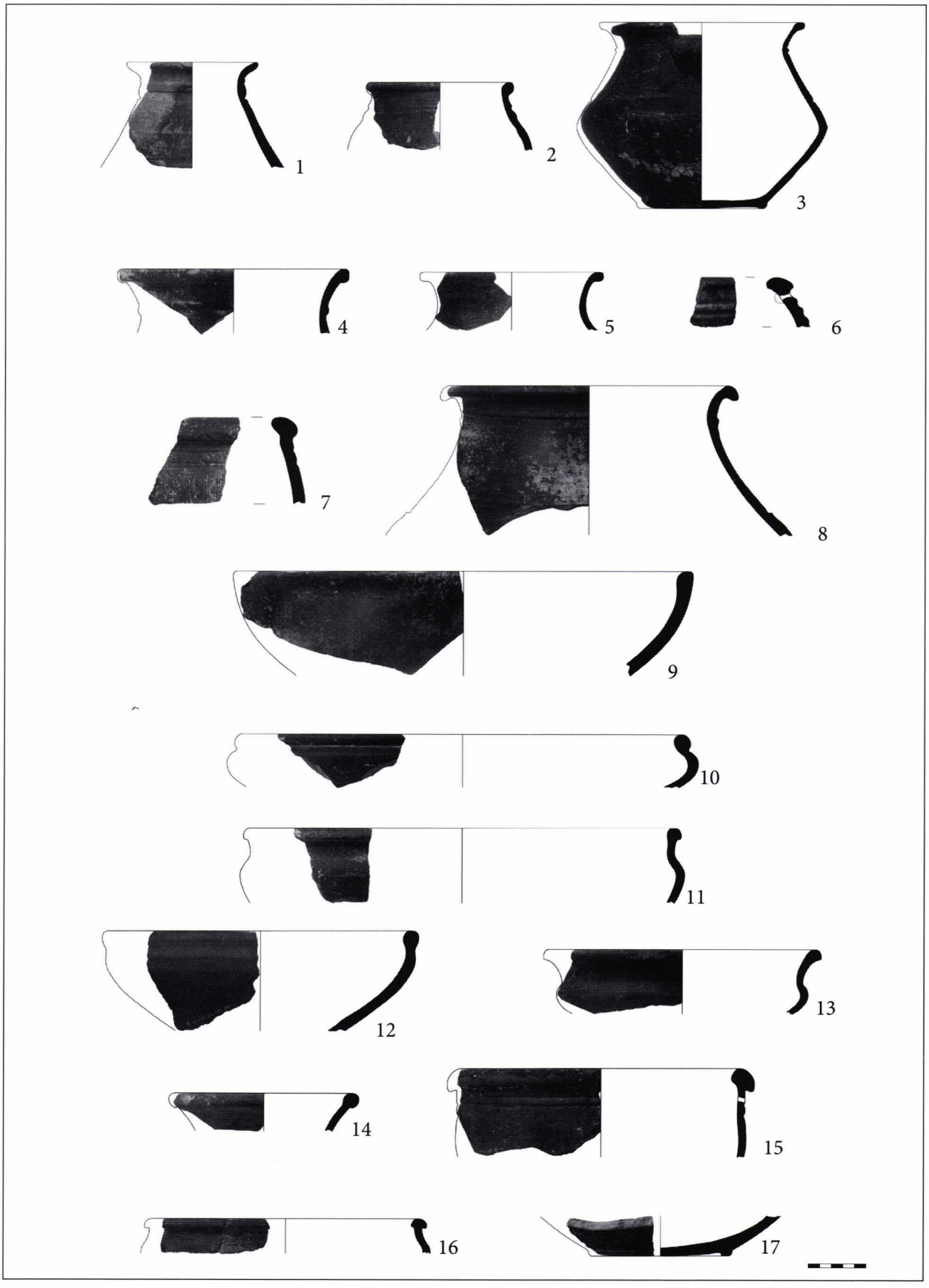

Plate 9. Finds from the feature (pit-house) 73/136 – late phase of the settlement.

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Traces of Prehistoric Smelting Workshops in the Carpathian Basin

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Keywords: workshop, roasting, smelting furnace, gold, copper, iron

One of the most interesting questions in prehistoric archaeology relates to the exploitation and possible smelting of metals. Although this field was extensively studied in the past, so far there have been only case studies from the Carpathian Basin. According to present knowledge, gold, copper and iron were extracted and processed in this region but some scholars assume that silver, tin, antimony and perhaps lead were also used. Among the research methods utilized, the analytical methods employed are the most traditional ones.

The earliest examinations of this type date back to the nineteenth century (concerning the history of metal analysis see: Pernicka 1990). Their results provided the solid background for the greatest analytical series in the second half of the twentieth century (e.g. Junghans *et al.* 1960; 1968; 1974) and the data derived from them is being extensively re-processed and studied from the turn of the twentieth and twenty-first centuries with the aid of computer technology (Liversage 1994; Krause–Pernicka 1998; Krause 2003). Although analytical methods have lead to some success, the geological background was nearly totally neglected. A small change was required in the few years when samples had to be collected for the analysis of lead isotopes (eg. Schreiner 2007).

Although the most important steps of the *chaîne opératoire* are known in the case of copper due to research in the zone of the Eastern Alps by Eibner (1982). The exploitation and further processing of gold and iron were documentated from excavations by Cauuet (2004a, 71–72) and Pleiner (2006) respectively but there is insufficient information about the distribution of semi-finished products in prehistory. In the case of the semi-finished products of the Late Bronze Age and ideed the whole of the Bronze Age those types which have been identified as the most important from the point of view of research (Czajlik 1996; 2006), but in the case of other metals and periods, we have only limited informations (e.g. Tylecote 1987).

If one chose to focus on the decisive and direct evidence, one would have difficulties. A selection of some prehistoric mines, published many times but studied without their broader context, does not imply that there is detailed information as in the case of the Eastern Alps. Traces of ore processing, blooming and smelting are more difficult to assess because we have only a few examples and many of them have been published with faulty excavation data. The goal of the present study is the systematization of the available informations about prehistoric ore processing, blooming and smelting workshops in the Carpathian Basin. We hope that the presentation of the problems will lead to the publication of new information and perhaps will also lead to a new initiative in research.

It is obvious that ore processing is based on available ore resources. Expedience and quantity were already key factors in the prehistory; therefore, one has to presume that highly metallic mineral

Iron Age Crafts and Craftsmen in the Carpathian Basin, 2014, p. 139–146

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accumulations were present near the surface. Quantity itself is not crucial by all means, but it seems to be certain that the zones which might be regarded as localities of mineral significance are only suitable for short-term exploitation when other local features are adequate.

The most important evindence of ore processing is the presence of slag. The study of copper slag deposits in the Eastern Alps have often led to the discovery of bloomeries and smelting furnaces. But in many recently published cases, the presence of iron slag has not indicated such activity, because the remains that appeared to indicate smelting proved to be traces of blacksmithing. It is therefore important to distinguish clearly ores resulting from smelting and those which are the result of blacksmithing. There are Medieval sites that have been studied in this way and the results are promising (Molnár 2011).

The latter example demonstrates that it is almost a given that most of the discovered sites are Roman, Medieval or Migration period slag deposits and only a minute study reveals the presence of traces of prehistoric blacksmithing or roasting and/or smelting. One can mention here research in the Burgenland in the 1930s by Barb (1937) who identified the slag deposits there as Medieval and it was discovered in the 1970s–80s that the area is one of the most important Celtic ironworking site in the Carpathian Basin (Urban 2002).

Since then, the very efficient AMS ^{14}C method has emerged for solving dating problems (Veldhuijzen–Rehren 2007, 191). Among the finds from workshops there are pieces of charcoal close to or inside fragments of slag and this allows a precise dating despite the usual lack of artifacts. It has to be remarked here that these sites usualy belong to mountain zones in the Carpathian Basin and our knowledge of the archaeological topography there is limited. Therefore it is not enough to identify the prehistoric mines, bloomeries and furnaces but there is also a need for basic topographic research.

As a logical consequence of the chain of thought above, the workshops' identification is based usually on the known geological features. A very cautious analysis of the evidence must be followed by controlled excavations carried out by specialists. It is not surprising that information from the Carpathian Basin is slim and that only cautious conclusions can be drawn from them. Most of them refer to the activities in the Iron Age and they prove the smelting of iron. Information about the processing of gold and copper ores is uncertain and there is so far no evidence of other metals and alloys yet.

According to our present state of knowledge, the extracting of gold in prehistory was for a very long time limited to gold panning. Possible placer deposits were identified by Bácskay (1985). Unfortunately, gold panning leaves no archaeological traces and research of the workshops based on this kind of mining would seem to be rather difficult.

The most succesful research program into prehistoric gold processing has been carried out in Limousin, France (Cauuet 2004a). Not only the artificial gullies, the results of ore extraction, and through excavation, even the workshops were found. Although there is no reason to rule out that there were attempts at organized mining in the Bronze Age, due to the evidence of pottery finds in secondary position, substantive exploitation could only begin in the fifth-fourth centuries BC. We cannot expect any extraction of primary gold deposits before the Iron Age in the Carpathian Basin but in the zone of Roşia Montană joint French, Romanian and German research has revealed, that the mining of gold-bearing ores started as early as the Celtic Period (third-first centuries BC) as is suggested by ^{14}C dating of the wooden pit-props from the ancient mines. As far as we know, the reconstruction of further technological steps and the identification of workshops in Limousin has not yet been carried (Cauuet 2004b; 2005).

We will not review here the copper smelting workshops of the Eastern Alps; our present study focuses on the sites situated on the western periphery of the Carpathian Basin. The researches of Presslinger, in the area around of Schladming (Liezen, Austria), prove that ore was mined and processed there in the Late Bronze Age (Presslinger–Köstler 1993). At Ramsau (also in Austria), three copper slag deposits can be dated as prehistoric through ^{14}C dating and according to the topographical surveys of Klemm (2003). The nearest ore smelting sites to the Late Bronze Age centres of Transdanubia (Hungary) have been found in the zone of Mount Rax (Austria). There is little doubt that the raw materials were mined there (Hampl 1953). From the Northern Carpathians (Slovakia) we have relatively little information about copper extraction or blooming/smelting, despite the favourable geological conditions. A well-known example is a hoard of more than 150 miners' hammers from Špania Dolina. Near to this site, there was also a roasting site excavated at Slovenské Pravno (Liptaková 1973) attributed to the Ludanice

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Culture (Točik–Žebrák 1989); this represents the earliest known workshop in the Carpathian Basin related to ore processing.

The most interesting Northeastern Carpathian site has been found at the Vihorlat–Gutâi–Lăpuş range, near Dragomireşti (Romania). According to Rusu (1981) this seems to be a slag deposit similar to the examples from the Bronze Age of the Eastern Alps. Unfortunately, this site's description is not detailed, but the site itself seems to be similar to the examples from the Bronze Age of the Eastern Alps, known in great numbers in the area of the Mitterberg. To be added is that there is also indirect evidence of prehistoric exploitation in this Carpathian zone. Near Oraşu Nou (Romania) a socketed axe was found (Boroffka 2009, 126) and in the most important ore yielding zone at Baia Mare–*Kereszt-hegy* a copper pickaxe of the Székely–Nádudvar-type has been found (Kacsó 2003).

Although the Transylvanian ore mountains is known primarily from its gold mines, we also have to mention the archaeological information, which seem to be related to the processing of copper. The most significant example comes from the zone of Baia de Arieş (Romania), where an ancient copper mine and thirty-two furnaces were found (Rusu 1981). The remains of the furnace at Sândominic (Romania, Bălan ore deposit) could not be dated precisely, but it seems to be prehistoric.

The most important mines of the Timok Massive are known from the area of Rudna Glava in Serbia (Jovanović 1988). Despite the favourable conditions, there are just a few traces of prehistoric mining from a significant period of the Neolithic, according to the newest ^{14}C dating (6100–4650 cal BC). Mining was not totally abandoned after the Copper Age (Borić 2009). Evidence of roasting and smelting is not known from this area, but this is not surprising, because in this period it was common to use secondary copper ores. On the Timok Massive's northern periphery, smaller gullies were identified at Moldova Nou (Romania). According to surface finds, they are to be dated to the Copper Age (Boroffka 2009). Traces of roasting and smelting are not known from this area.

The earliest evidence for prehistoric iron smelting sites in the Carpathian Basin (HaB) is a series of twelve iron ingots from Cernat (Romania), where it seems to be likely that the limestone and slag pieces found there refer to a local iron smelting workshop. However, the presence of small pieces of limestone and small amounts of slag as well, without further study comprising analysis and excavation, does not clearly indicate such a chronologically early smelting activity. It could be also possible that only semi-products were processed, re-heated or forged there (Székely 1966a; 1966b; 1970).

Very early traces of blacksmithing have also been documented at Dolenjsko (HaC), but the slag from a pit is – once more without analysis – again not clear evidence of the early ironworking. At the same time, it is a fact that geophysical surveys have revealed a number of archaeological structures which could be interpreted as a smelting complex (Križ 1999).

The analysis of the slag from (Čečejovce, Slovakia), the iron ore identified there and the furnace wall fragments found there prove that the processing of the local ores began certainly in the HaD / LT A period in the Bódva valley (Miroššayová 1995). Big amounts of silicate and metal slag were found in the Tarna valley as the result of excavations which preceded the industrial park's construction near Salgótarján (Hungary). The results of the analysis based on the presence of two types of slag and the intermedier products proves that there was iron smelting activity there, even though there is no further evidence among the finds and the archaeological structures (Czajlik *et al.* 2003).

According to preliminary reports iron-working in this area is to be dated to the Scythian period (Ha D / LT A), similar to the site at Čečejovce (Vaday 2003). There are new results from Dédestapolcsány–*Verebce-tető* in Hungary (Hellebrandt 2007; Czajlik *et al.* 2008, 122), where numerous slag pieces were found. In the summer of 2011, the Institute for Archaeological Sciences at the Eötvös Loránd University and the National Centre for Cultural Heritage carried out detailed topographical surveys in that area, proving that they refer to iron smelting activity and belonged approximately to the same period as the site mentioned above (V. Szabó *et al.* 2014; Czajlik *et al.* 2014).

The most important site of the period between the fourth-second centuries BC is Sajópetri–*Hosszú-dűlő* (Hungary), significant also in a wider European context. The silicate and metal slag found there, the various flux materials, a locally produced unfinished currency bar and the topographical separation of the traces of working process indicate clearly that iron smelting was pursued there (Szabó–Czajlik 2006; Czajlik–Molnár 2007). It has to be stated that in the case of Sajópetri–*Hosszú-dűlő*, the most important feature, namely the furnace (or bloomery) could not been identified, despite that ninety per

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cent of the La Tène site has been excavated. But the pits that contained at least 200 m³ of iron slag may be an indication that a special technology was used there, which did not require a furnace. It is widely known that the earliest smelting practices were based on a technology without a furnace. The so-called simple bowl furnace described by Coghlan (1956) is nothing but a pit where the roasted ore was mixed with charcoal and ignited, covered with earth and thus melted in a reductive environment. It is evident that the form of the pit changed after each smelting process, the burnt parts remaining in a state that resembled a closed furnace, but neither the bottom nor the walls or tuyère were preserved, because there was no need for them using this technology. Unfortunately, there is little reliable evidence though we may cite the settlement of Kestor in Devon (Shepherd 1980, 213, fig. 97).

From the end of the second century BC we have a series of records for iron smelting in the Carpathian Basin. Many slag deposits are known from the area of the Austrian Burgenlad (Urban 2002) and particularly from the zone of Oberpullendorf, where a number of furnaces, to be dated to the Late La Tène period were found (Neugebauer 1992). This ore formation in the Burgenland continues into western Hungary and it was also extracted in earlier periods. There are remnants of La Tène furnaces from Kőszeg–*Pogány-erdő* (Miske 1929, 91, Abb. 11) and again certainly La Tène ones from Szombathely (Olad)–*Reiszig-erdő alatti dűlő* (Ilon 2004, 81). West of Szombathely near to the Austrian settlement of Hüttenberg/Möselgut the excavation of a Late La Tène furnace has also been reported (Sperl 1999).

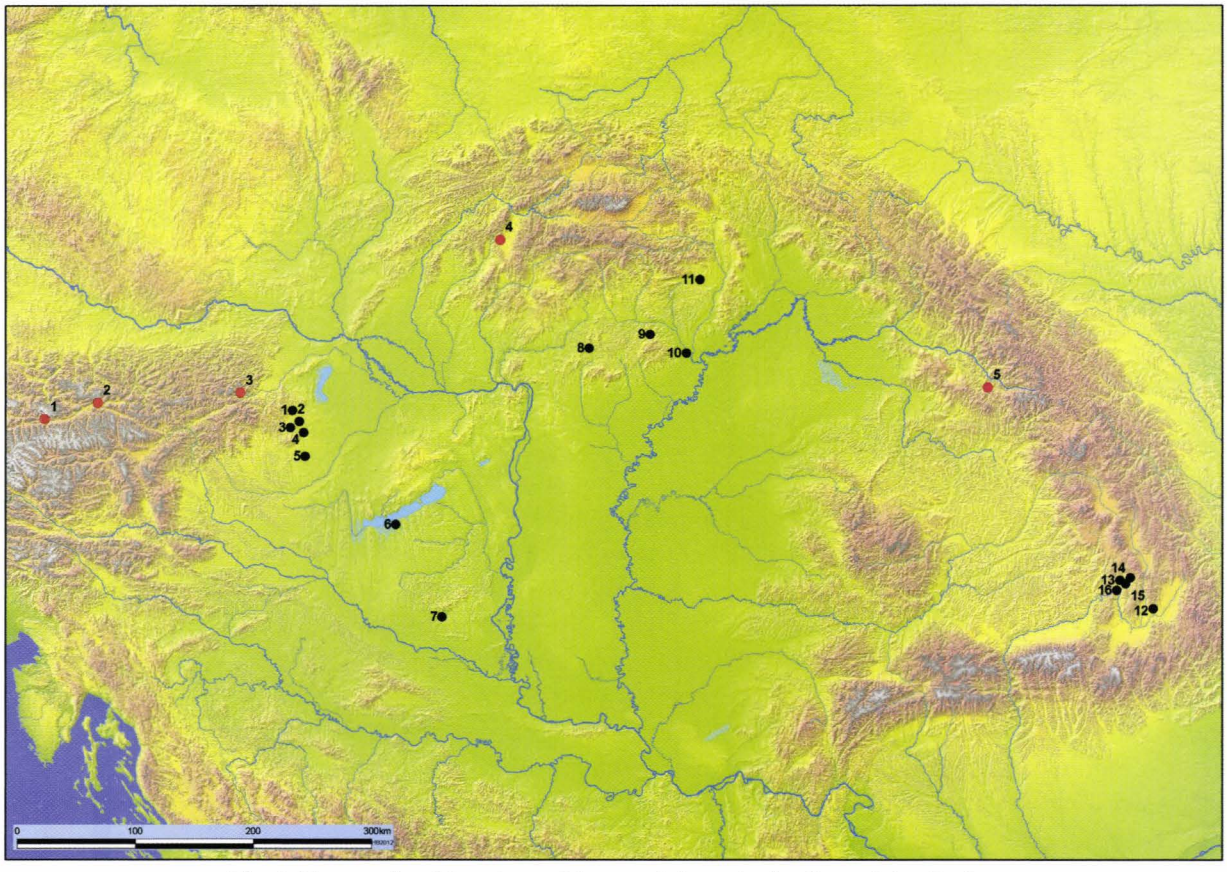

Fig. 1. Traces of prehistoric smelting workshops in the Carpathian Basin.
Red: copper smelting. 1. Ramsau; 2. Liezen; 3. Prein a.d. Rax; 4. Slovenské Pravno; 5. Dragomireşti.
Black: iron smelting. 1. Weppersdorf; 2. Oberpullendorf; 3. Piringsdorf; 4. Klostermarienberg;
5. Szombathely-Olad; 6. Ordacsehi; 7. Pellérd; 8. Salgótarján; 9. Dédestapolcsány; 10. Sajópetri;
11. Čečejovce; 12. Pădureni; 13. Doboşeni; 14. Herculian; 15. Biborţeni; 16. Augustin.

Due to the lack of our knowledge of the geological situation of the Transdanubian region's other zones, significant basic research will be needed to identify the La Tène smelting sites of Ordacsehi (Honti *et al.* 2004, 44, pl. XV.2; Török *et al.* 2013) and Pellérd (Ecsedy 1981). In Slovakia, beside the site of Čečejovce mentioned above, some fifty-three sites with slag deposits are known in the valleys of the Hornad and Poprad rivers, while in nineteen cases it has been possible to investigate the smelting furnace (Roth 2004).

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The Holy Cross Mountains (Góry Świętokrzyskie, Poland) are located outside the Carpathian ring, but due to the magnitude of production, we take include the iron originating from there in the prehistoric period. The intensive smelting took place in a zone of 800 km², between the Holy Cross Mountains and the Kamienna River in the period between the Late La Tène period until the mid Roman Age (Bielenin 1999).

As the records from Čečejovce, Dédestapolcsány and Salgótarján indicate that there was iron smelting activity in the Late Iron Age in the northertn part of the Carpathian Basin, the unique finds from Cernat show that this type of ironworking was also pursued in the zone of the Eastern Carpathians. Not far from Pădureni a Late Iron Age furnace (or perhaps multiple furnaces) was excavated (Téglás 1887, Roska 1942, Székely 1981) but the majority of the early furnaces come from the Baraolt basin, north of the Braşov basin. Further Late Iron Age furnaces are known from Doboşeni–*Borvízoldal-Hegyfarka* (Székely 1959), Herculian as well as Biborţeni and Augustin (Székely 1981). Beside the two furnaces at Doboşeni, a bigger amount of slag, Vargyas limestone, charcoal, millstones and pottery from the second-first century BC were found (Ferenczi 1999). Although in the Roman Age ore extraction in the southern Carpathians mountains of Poiana Ruscă and Sebeş has been known for some considerable time (Téglás 1895), we have no information about excavations of other smelting centres from that zone.

Without systematic research in the Carpathian Basin, it seems to be impossible to list detailed and sound evidence as in the case of the Eastern Alps in order to prove the existence of prehistoric smelting workshops. But the extensive study of separate regions, especially of evidence for iron ore processing, suggests that if it were possible to carry out precise studies of the zones listed in the present article, we could obtain important informations about the region's prehistoric economic history by means of detailed topographical studies and the use of modern dating and excavation techniques (Fig. 1).

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List of figures

Fig. 1. Traces of prehistoric smelting workshops in the Carpathian Basin. Red: copper smelting. 1. Ramsau; 2. Liezen; 3. Prein a.d. Rax; 4. Slovenské Pravno; 5. Dragomireşti. Black: iron smelting. 1. Weppersdorf; 2. Oberpullendorf; 3. Piringsdorf; 4. Klostermarienberg; 5. Szombathely-Olad; 6. Ordacsehi; 7. Pellérd; 8. Salgótarján; 9. Dédestapolcsány; 10. Sajópetri; 11. Čečejovce; 12. Pădureni; 13. Doboşeni; 14. Herculian; 15. Biborţeni; 16. Augustin.

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Traces of Iron Smelting in La Tène Iron Age Settlement at Ménfőcsanak

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Keywords: Late Iron Age, La Tène culture, NW Hungary; Celtic settlement; iron blommery, iron ore, iron slag, smelting, slag-pit furnace, tuyere

In the vicinity of Ménfőcsanak, near the city of Győr, on top of a levee on the southern side of the Marcal River lies a complex of La Tène sites including a large cemetery and cluster of settlements (Pl. 1). The first burials were found in 1967. The ten burials recovered during this short period of rescue excavation made Ménfőcsanak a key La Tène site in the Carpathian Basin (Uzsoki 1969a; 1969b; 1987). Excavations started on a larger scale in 1993 in and around the area of the previously known cemetery. Two and a half hectares were investigated and 277 burials unearthed, making this the largest excavated Celtic burial ground in the Carpathian Basin (Egry 2007, 32–33). According to preliminary reports the cemetery dates to the LT B1-C period (Vaday 2006, 609; Egry 2007, 33).

While Ménfőcsanak became an important archaeological site in terms of burials in the history of the Celtic 'migrations' in the fourth century BC, the Late Iron Age settlement to the east of the cemetery has not yet received the attention it merits. The completion of the processing of material from excavation prior to the construction of *National Highway 83* (which took place in 1993) and the *Bevásárlóközpont* excavation (in 1995, 2006) has provided an opportunity briefly to summarize the settlement features and archaeological assemblages (Tankó–Egry 2009; Tankó 2012a).

Another large-scale excavation was the Celtic settlement investigated between 2009 and 2011. During this from an area of 277.165 m^2 nearly eleven thousand structures has been documented (Pl. 1/1–2). More than 90% of the archaeological finds were dated to the Late Iron Age and Roman Imperial Period. The remains of these two periods were observed the most intensely (Ilon 2012a, 104–105; Ilon 2012b, 237–238; Merkl–Ilon 2012, 53).

The Late Iron Age settlement site is located on the gentle slope of the *Szeles-dűlő* hill rising above a bend in the Marcal River to the north of Ménfőcsanak, and is surrounded by the marshy meadows of the Pándzsa stream. According to current data it is apparent that the Celtic settlement of Ménfőcsanak was established in the LT B1 phase, in the second half of the 4th century BC. It was abandoned during the LT B2/C1 transition period or LT C1 period at the latest, in the second half of the 3rd century BC (Tankó 2012a, 256–257).

Based on the uncovered structures and artifacts, Ménfőcsanak was primarily an agrarian settlement (Tankó 2012a, fig. 3). However, can be observed in the case of recently published Celtic villages in north-east Hungary (Szabó–Czajlik 2004; Szabó *et al.* 2008), much information suggests that industrial activity – mainly metalwork – was conducted on primarly agricultural land at Ménfőcsanak too. The most obvious signs of this are the iron ore (Pl. 2/6) and/or furnace slag (Pl. 2/8, 10),[1] even though no

1 We would like to thank to A. Vaday for allowing us to analyse the findings.

Iron Age Crafts and Craftsmen in the Carpathian Basin, 2014, p. 147–160

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in situ bloomery furnace was found. Analyzing the fragments of slags on the site it can be determined that the iron processing was carried out in the southern part of the settlement, near the structure 93/31, 93/492, and 95/49. The finds which can be connected primarily to ironwork were found in sunken buildings or in their vicinity in this part of the settlement. The largest volume of iron ore (two pieces) and bloomery slags (52 pieces) were in the filling of the building no. 93/31 (Tankó 2004). Some of these fragments of slags and ores were analyzed by X-ray diffraction (Fig. 1).[2]

ID	S%	Fe%	MnO%	P_2O_5%	TiO_2%	Cr_2O_5%	SiO_2%	Al_2O_3%	CaO%	MgO%	Na_2O%	K_2O%	V_2O_5%	Cr_2O_3%
31/1. obj., 95.1.2014, material	0.04	2.52	0.05	0.16	0.20	0.02	44.31	7.38	42.11	2.51	1.19	1.2	-	-
31/1. obj., 95.1.2014, crust	-	0.44	-	-	-	-	17.11	1.11	$CaCO^3$ 81.69	1.72	-	-	-	-
31/3. obj., 95.1.636 slag	0.08	2.60	0.19	1.22	0.37	0.01	68.20	10.00	14.75	1.88	2.29	4.19	-	-
31/1. obj., 95.1.626 iron ore	-	39.81	3.49	0.66	0.08	-	7.87	1.85	5.8	1.31	-	-	0.032	0.01
31/4. obj., 95.1.644 iron ore (partly melted)		50.13	4.83	0.4	0.15	-	17.52	2.67	2.97	1.62	-	-	0.035	0.02

Fig. 1. Analysis of iron ore and slags from structure no. 93/31

The two iron ores were particularly interesting (Fig. 1/95.1.626 and 95.1.644; Pl. 2/6). Both of them had high (40–50%) iron content (Fe). The good quality iron ore had a high content of manganese oxide (MnO), with a significantly lower content of titanium oxide (TiO_2), vanadium oxide (V_2O_5) and chrome oxide (Cr_2O_3). During the blooming process these components of ore had improved the quality of the iron and would probably have increased the impact strength and wear resistance however, this may have been at the expense of its tensile strength. The high volume of silicium oxide probably had no effect on iron quality (more than 1 m% in iron can cause difficulties in machining), because most of it was removed from iron ore as slag during the smelting process. The iron ore contained in small amounts calcium oxide (CaO), magnesium oxide (MgO) and alum earth (Al_2O_3).

This raises the question what was the source of this iron ore? There are several ore deposits at the western, south-eastern and eastern edge of the Small Hungarian Plain. Ferrous minerals are known in the Burgenland and Transdanubian mountains (Gömöri–Kisházi 1985, fig. 1), According to the present state of research only in Burgenland and the western part of Hungary – from Oberpullendorf to Vasvár – has it been possible to prove iron ore mining taken place in the Iron Age (Schmid 1977, 11–23; Meyer 1977, 25–48; Bieleinin 1977, 49–62; Kaus 1977, 63–70; Czajlik 2012, 55–56). R. Pleiner in many works dealing with the theme of early iron smelting and smithing in Carpathian Basin, localized a mining and primary processing center in the Burgenland based on east Austrian iron ore deposits (Pleiner–Princ 1984, Tab. 5–7; Pleiner 1994, fig. 1). After analyzing iron ores and slag samples, which was found in western Hungarian La Tène Iron Age settlements, it seems that the processing of ferrous minerals was not limited to only the Burgenland, but the using of bloomery technology is also detectable further afield – for example Sopron-*Krautacker* (Gömöri–Kisházi 1985, 337, fig. 7) or Velemszentvid (Czajlik 2000, 70–71).

Ménfőcsanak is located roughly 100 km east from the processing center mentioned by Pleiner. However, it is not surprising. According to Pleiner, the small-scale production of early ironmakers was in any case not dependent upon the rich and large ore bodies which become important late; only in stead, very small deposits of bog ore or weathered limonite and haematite outcorps in the vicinity of

2 The analysis was conducted by Kohászati Múzeum and Metalcontrol Kft in Miskolc.

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the settlement could have been used (Pleiner 2000, 90); it cannot be excluded to have been the case at Ménfőcsanak.

Beside iron ore, the large amount of slags is also important evidence for the use of a bloomery smelter in Ménfőcsanak. According to the slag typology of Sperl (1980), residual furnace slag with embedded charcoal and unreduced ore pieces, Sperl type B1 (Pl. 2/8, 10), slagged wall, Sperl type B2 (Pl. 2/12) and last slag flow from the outlet channel, Sperl type C1 were found at the site. Analyzing slags confirmed that slag deposit on sandstone (Fig. 1/95.1.2014, Pl. 2/11) and the residual furnace slag (Fig. 1/95.1.636, Pl. 2/8) have detectable iron content (Fe). The analysis of ferrous slag composition has been made at La Tène period settlements at Ordacsehi and Sajópetri a few years ago (Czajlik–Molnár 2007; Török *et al.* 2013).

It is not a long distance in space or in time between Ordacsehi and Ménfőcsanak Celtic villages. It is necessary to compare the data because of Ordacsehi's relative proximity to Ménfőcsanak besides their similarities in settlement structures. There are ten samples of slags at Ordacsehi, but only two at Ménfőcsanak. In this situation and the relatively small sample size the resultant indicative values it is necessary in the future to have a larger sample to get a better picture about different types of furnace. The slags from Ménfőcsanak contain manganese oxide (MnO), but it is relatively low as is the case at Ordacsehi. However, significant differences can be detected in connection with the proportion of phosphorus (P_2O_5). This component has a significantly higher proportion than the sample in Ordacsehi (Török *et al.* 2013, 25, 1. táblázat). As J. Piaskowski has mentioned, the phosphorus could come from slag-forming gangue during the reductive smelting process. 0.4–0.7% rates of phosphorus are not rare in this situation (Piaskowski 1965, 84). The high rate (7–10%) of alumina (Al_2O_3) is also nooticeable in the Ménfőcsanak slags. The alumina content rarely exceeds 6%, but higher values have also been described, for example from Mšec in the Czech Republic (Pleiner–Princ 1984, 159). Alumina comes principally from the ore gangue or furnace lining, while it also comes from fuel ash (Pleiner 2000, 252). The samples examined from both sites are acid slags in which there is more silica and silicates (SiO_2) than lime (CaO) and magnesia (MgO).

There could be several reasons for the high rate of silicates and lime. The iron ore might be contained it, but these components could be enriched from the additional slag-forming gangue (limestone, sandstone, clay, etc.) during the smelting process. Recently conducted research has shown that, on the surface of metallurgical slags contact with the soil particles may produce a thin silicate oxide layer. This may have different results in examination (McDonnel 1991, 25).

Low levels of sulfur (S), sodium (Na_2O) and potassium (K_2O) can be found only in slags. These components are missing from iron ore, thus it can derive from the fuel ash. Components (mainly MnO, TiO_2 és MgO) of examined slags in Ménfőcsanak are related with the early medieval slags from Hidegség (Gömöri 1995 194, Abb. 8). The similarity between Late Iron Age and early medieval slags requires further investigation.

In structure no. 93/31 there were two fragments of stone, which have slag flow deposit on their surface (Pl. 2/11). Analyses were made both for the slag (Fig. 1/95.1.2014 material) and the limestone (Fig. 1/95.1.2014 crust). The fragments of limestone contain quartz (SiO_2) in smaller part (17%) and calcium carbonate ($CaCO_3$) in greater part (82%). The carbonate rocks (e.g. limestone) are used in iron metallurgy today as slag-forming gangue, but this method of slag-making was known alteady known in the La Tène settlement of Sajópetri (Szabó–Czajlik 2004, 131; Czajlik–Molnár 2007, 265). In the case of Ménfőcsanak – according to the polished side of sandstone – this was not a slag-forming gangue but more likely was used for the construction of furnace.

Based on this information, it was certain that good quality ore with a high percentage of iron (Fe) was available at Ménfőcsanak. This contained some of components (Mn, Ti, Cr, V) which improve the quality of steel. Most of the harmful substances (P, Si, Ca) left as slag from the ore during the smelting process, while some other elements (S, Na, K) was left as slag-forming gangue or fuel ash.

There is not any direct data to reconstruct the blooming furnace, since it was not possible to investigate the furnace *in situ* in Ménfőcsanak. However – like as was previously mentioned – Sperl B1 type residual furnace slag with embedded charcoal and unreduced ore pieces (Pl. 2/8, 10), Sperl B2 type slagged wall (Pl. 2/11) and Sperl C1 type last slag flow from the outlet channel were found in the structures of Celtic settlement; this, according to Sperl's theory (Sperl 1980, 14–18, 64–65), refers

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to use of a smelting furnace. The curved rim-crafted, highly burned fragment of a pottery structure with indications of the flow deposit of slag might be a part of a furnace. Some stone fragments also refer to the use of furnace. The highly burned sandstone with slag deposition may be associated with iron smelting. Many examples are known that inside the furnace may be lined with sandstone in order to maintain the heat inside effectively (Krasa 1933, fig. 5; Garner 2011, fig. 16–17). Bloomery furnaces lined with clay – sometimes having stone lining at their basis – are known in the eastern Celtic world.

Domed furnaces were widely used in the Late Iron Age from Bavaria to the Burgenland (Pleiner–Princ 1984, 133–135, Abb. 1). This 'Burgenland type' furnace (Bielenin 1994) has not yet been discovered east from the eponymous region, but based on available data we cannot exclude that the domed furnace was used in Ménfőcsanak. Another type of furnace – widely used form the Czech Republic to south Poland and eastern Austria (Pleiner 2000, 149–162) – is the slag-pit furnace (Pl. 2). It has great variability of form and constructions but usually it is easy to identify by its slag pit. Although its existence cannot be denied there is a yet no information about it having been in use in Ménfőcsanak.

A new find probably having been in use in connection with metallurgical activity was uncovered in 2011 in the north-eastern area of the La Téne settlement.[3] The archaeological structure has two different numbers in the documentation, because the limits of the excavation could not be identified in the soil, thus these two structures are considered one context based on the location of the finds. The structure 8539/8654 was a shallow pit from which pottery and animal bones were unearthed (Pl. 3). Two pots standing on their mouths were found at one end of the pit. Between them three other pots, were broken and were lying on the bottom of the pit togather with some other sherds, animal bones and a clay funnel-shaped vessel. The animal remains were identified as bones of hares, sheep and goats. Beside the hand-made, graphite tempered, bi-conical shape pots and conical shape bowl, there was a wheel-thrown, black colored, reductive fired cooking pot found (Pl. 4/2). There is no doubt that this last was the product of the La Tène culture and it is known many parallels from early and middle La Tène period in Transdanubia (Uzsoki 1987, pl. XIX, 1; Horváth 1987, pl. XVIII, 9; Tankó 2012b, 103, fig. 3). The dating of the hand-made pot with fingernail-impressed motifs under rim (Pl. 4/1) is more complicated. This type of pot is dated to the early La Tène period by Kappel (1969, 58–65) from end of Ha D to beginning of LT B is proved by many sites form east Austria and western Hungary too, like Sopron–*Krautacker* (Jerem 1986, Taf. 3) or Inzersdorf (Ramsl 1998, 21).

The most interesting find of this unusual context is the 'clay funnel' (Pl. 5). It is made of strongly tempered graphite clay; the surface is covered with graphite powder. It has a diameter of 190 mm, and 130 mm length. In the middle of the funnel-shape object there is a slightly oval hole with 35–40 mm diameter. It has cracks on it and slightly chipped on its rim. There was no opportunity to get a direct conclusion for the function of this object from this context. Because of its heavy weight and robust design the using as passage or avenue for a fluid or flowing substance in a pot cannot be imagined.

This find is unique and it is so far without analogies in La Tène material culture. However – considering its size and shape – it is very reminiscent of modern industrial tuyeres as used in present-day metallurgy. The tuyere is a nozzle into which the outlet tube of a blowing device is inserted, to permit a blast of air to be delivered to the interior of a smelting furnace. Its roles were to protect the bellows tube from the effect of the hot furnace charge and to dampen down the vibrations from the bellows to the furnace wall. Tuyeres were mostly made of specially prepared clays. Clay tuyeres usually used dry, so during smelting, the inner tips became fired and because of this these tips survive more frequently, than the rest of tuyere (Pleiner 2000, 197). The origin of clay tuyeres dates back to the Bronze Age, before the introduction of iron technology. Various types of tuyere were used for non-ferrous metallurgical operations (Tylecote 1987, 115–123). In iron production, tuyeres were used both in smelting furnace and in forging hearts (Pleiner 2000, 197–198). The shapes of tuyeres vary greatly. The earliest Iron Age finds are connected to the Late La Tène and Roman period. In this time the clay tuyeres were typical (Pleiner 2000, 208–212; Garner 2011, 64). Conical tuyeres (Pl. 6) have only been found at two Roman Age site, both in Vaud, Switzerland (Pelet 1973, 31–32, fig. 2–3; Pleiner 2000, fig. 56/1). They are similar to the find from Ménfőcsanak in form and size. They are 105 mm long (Ménfőcsanak: 130 mm) with a 30–40 mm bore

3 I would like to thank to G. Ilon for allowing the publishing of the findings from structure 8539/8645.

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(Ménfőcsanak: 35–40 mm). At Mšec in western Bohemia, in a Middle La Tène context a fragment of a thick, trumpet-shaped tuyere was found in a layer of slag and debris (Pleiner–Princ 1984, 145, fig. 8C, 10, 8). A similar conical-shaped tuyere was found in Siegen-Niederschelden which could be dated to LT B-C (Garner 2011, 40, fig. 46).

The fragments in Mšec and Siegen are clear evidence of the use of the conical-shaped tuyeres in the La Tène Iron Age. Based on this fact, it is highly probable that the 'clay funnel' – which was found in structure of 8539/8645 – in Ménfőcsanak is a tuyere for metallurgy. However, it was probably not used, although patches either major or secondary combustion heat traces can be observed on surface.

The tuyere of Ménfőcsanak is particularly interesting in its circumstances. Whole pots – two of which were standing in an unusual way – upside down — were beside sherds, animal bones and the mentioned industrial artefact. It is very difficult to understand the purpose of deposition and context of this find, but a similar pit was recently uncovered at Sajópetri. A whetstone and iron tools (shears, axe, iron knife and staple) were placed on a grind stone, which was found in a pit in the central part of the site no. 46A (Szabó *et al.* 2004, 26, fig. 3, 5). These depots are sometimes interpreted as a victim of construction, however often there is no available data for the interpretation. Finally, it is also questionable whether the carefully hidden artifacts are possibly indicative of an emergency situation or not (Guichard–Paquelot 2003, 16–21). However, the votive character of Sajópetri finds could scarcely be doubted. On the one hand there are no signs of disaster in the settlement. On the other hand, the composition of the depôt for agricultural production (a whetstone and grinding stone), livestock (shears), the tree and the building work (axe, staple) refers to both. The aim of ritual deposition could be the fertility and perhaps the flourishing settlement or to ensure security (Szabó 2005, 102; Szabó 2007, 225–227). Based on Szabó's intepretation of Sajópetri we cannot deny the possibility of a ritual purpose in Ménfőcsanak.

In summary, it can be stated even though a furnace was not uncovered many traces were found pointing to the on-site processing of iron smelting. The iron ore, the different types of slags, perhaps the fragments of furnace wall with flow slag and the conical tuyere confirm Celtic metallurgy in the early La Tène period at Ménfőcsanak.

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List of figures

Fig. 1. Analysis of iron ore and slags form structure no. 93/31

List of plates

Pl. 1. Győr-Ménfőcsanak. 1. Site plan with the location of the La Tène cemetery and settlement; 2. Distribution of iron ore and slags in the territory of southern part of the La Tène settlement.

Pl. 2. Reconstruction of the slag-pit furnace with the metallurgical finds in Ménfőcsanak. A. Before smelting: 1. shaft; 2. virgin soil; 3. tuyere; 4. bellow; 5. charcoal; 6. iron ore, staw or brush wood. B. After smelting: 8. furnace slag with ore residues and charcoal; 9. iron sponge; 10. slag bloc in the pit; 11. charcoal and ash (after Pleiner 1980; 2000).

Pl. 3. Ménfőcsanak, structure no. 8539/8645.

Pl. 4. Ménfőcsanak, pottery from structure no. 8539/8645.

Pl. 5. Ménfőcsanak, tuyere from the structure no. 8539/8645.

Pl. 6. Conical and disc-shape tuyeres (after Pleiner 2000). 1. Bellaires (Pelet 1973), 2. Ballyvourney (Tylecote 1986, without scale), 3. Bradown (Cleere 1963).

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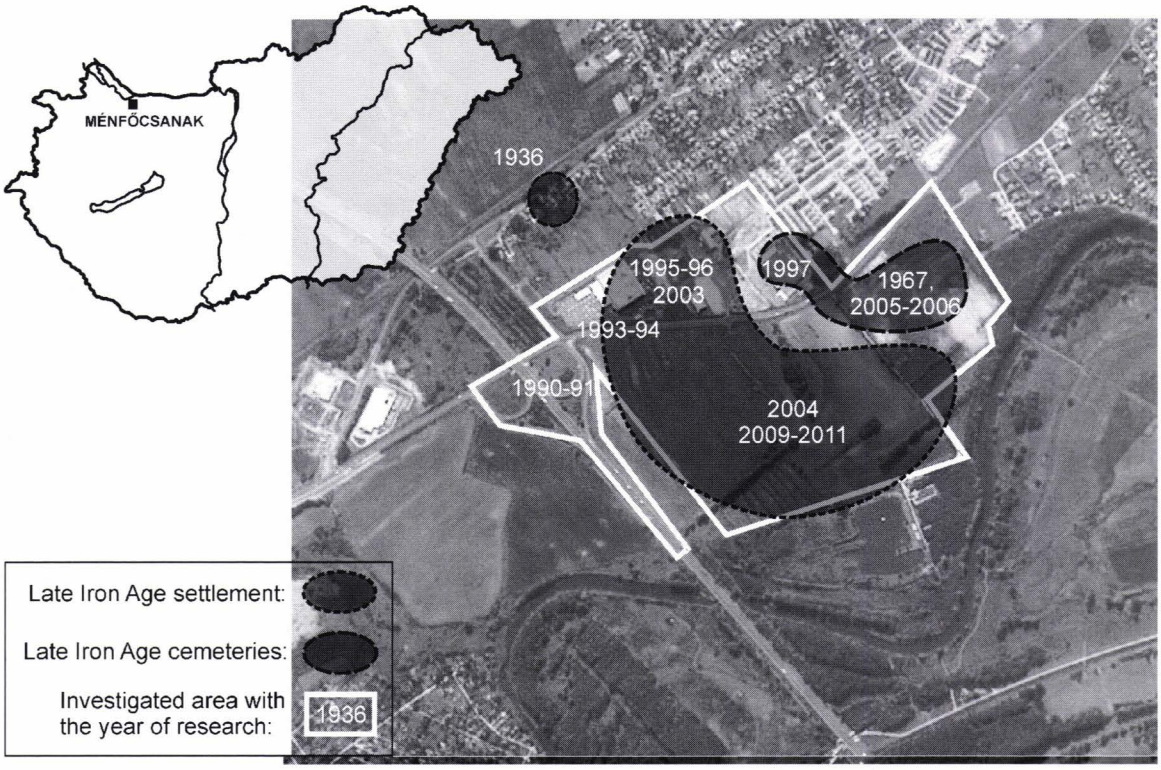

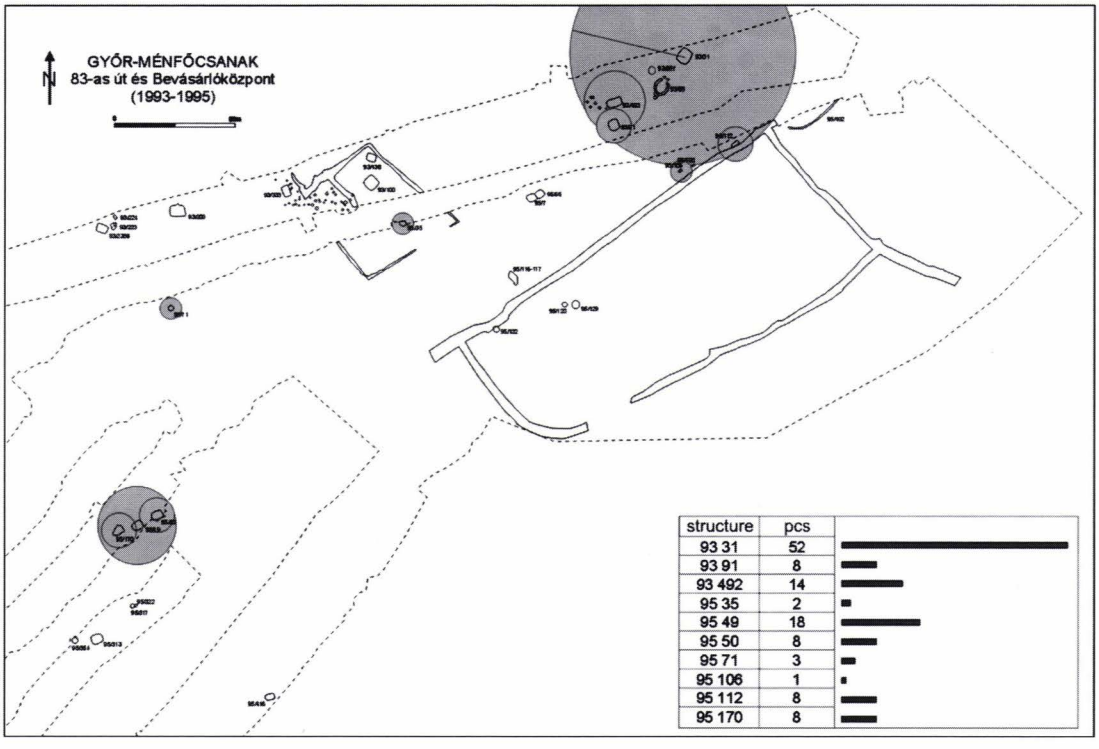

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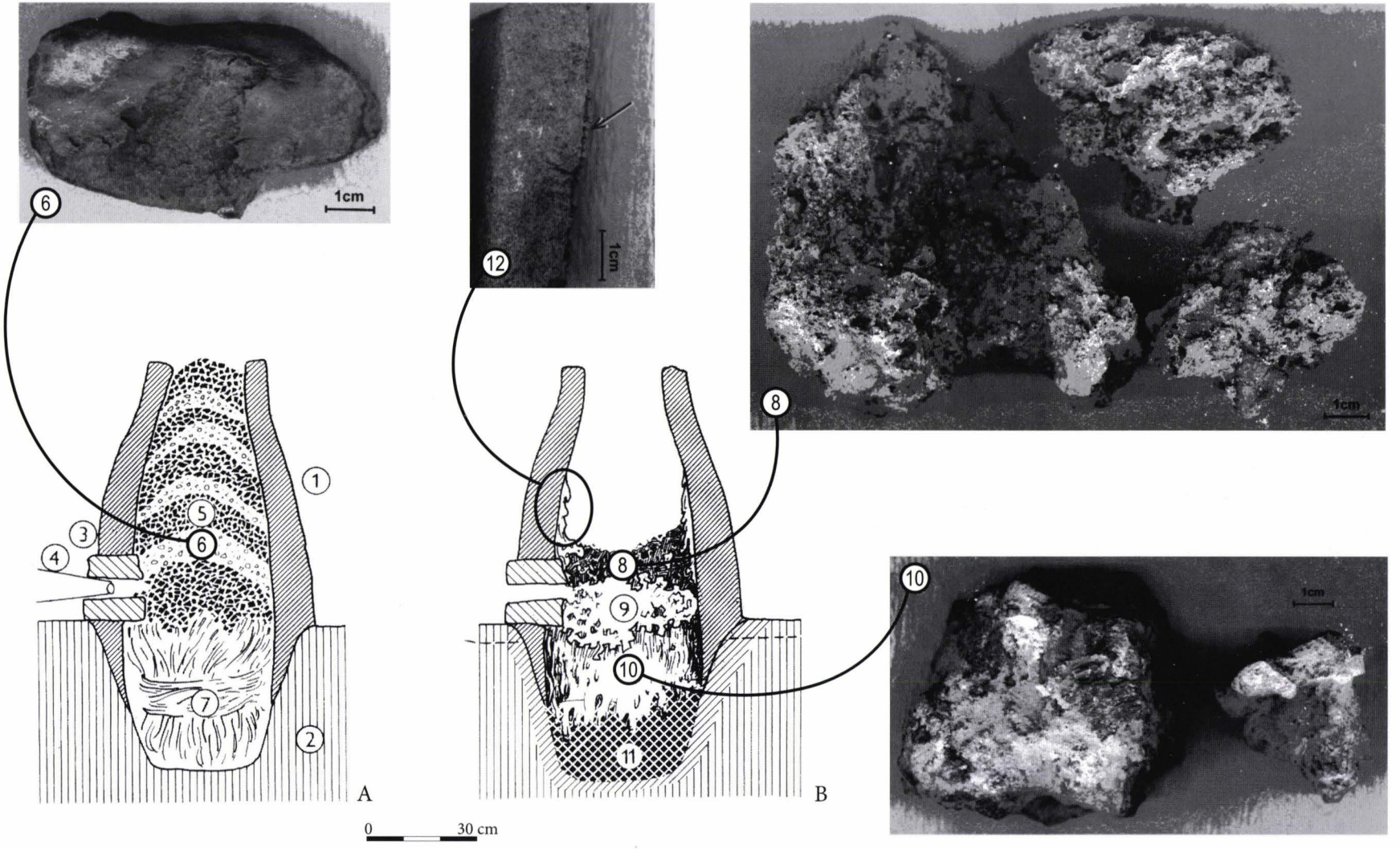

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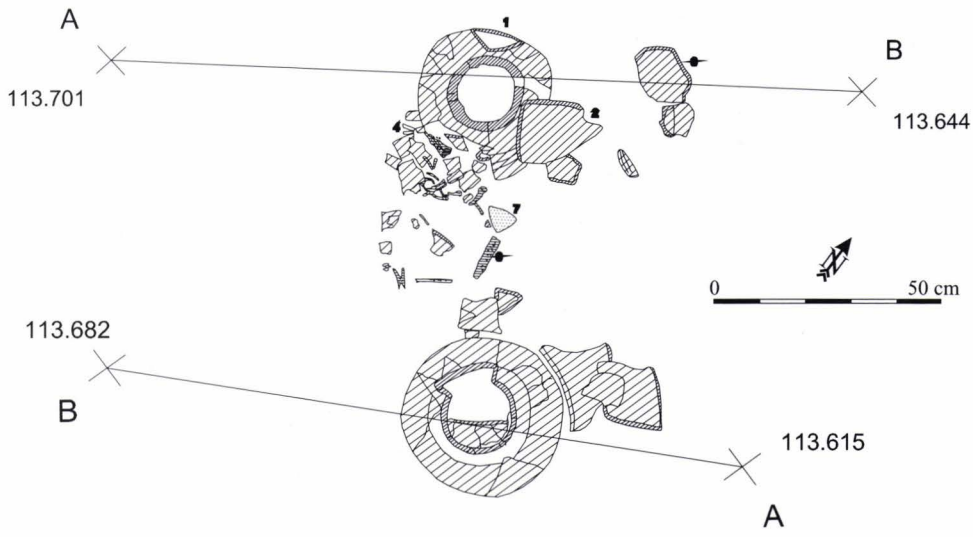

Plate 3. Ménfőcsanak, structure no. 8539/8645.

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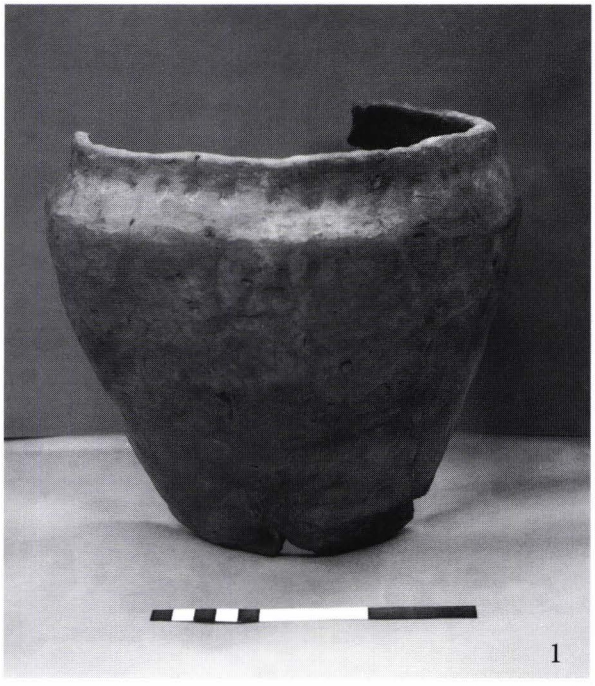

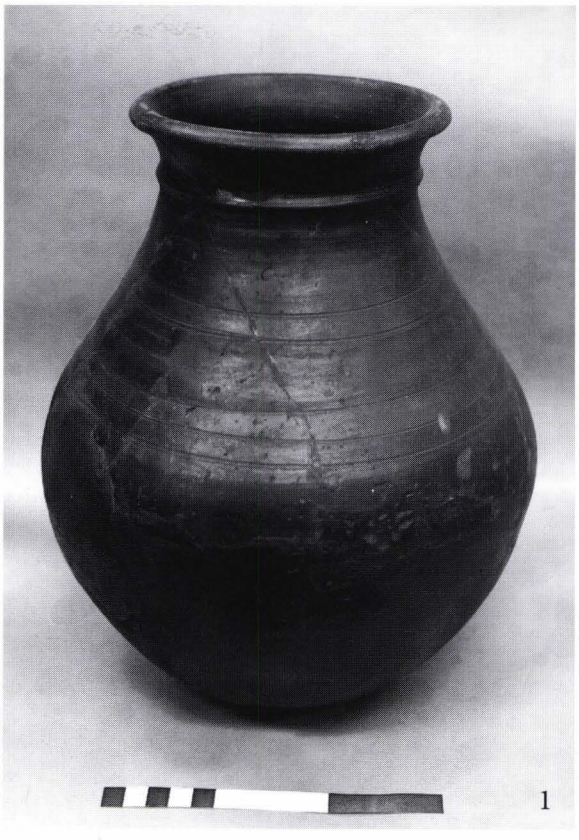

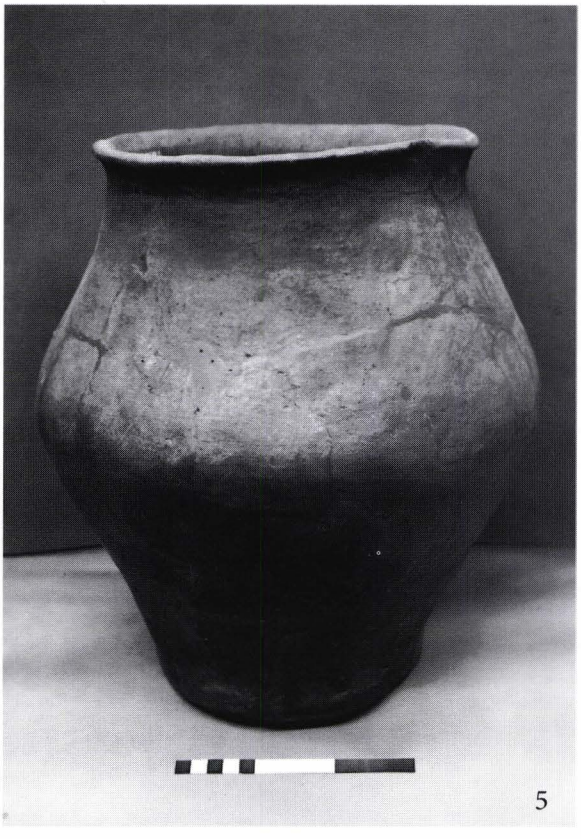

Plate 4. Ménfőcsanak, pottery from structure no. 8539/8645.

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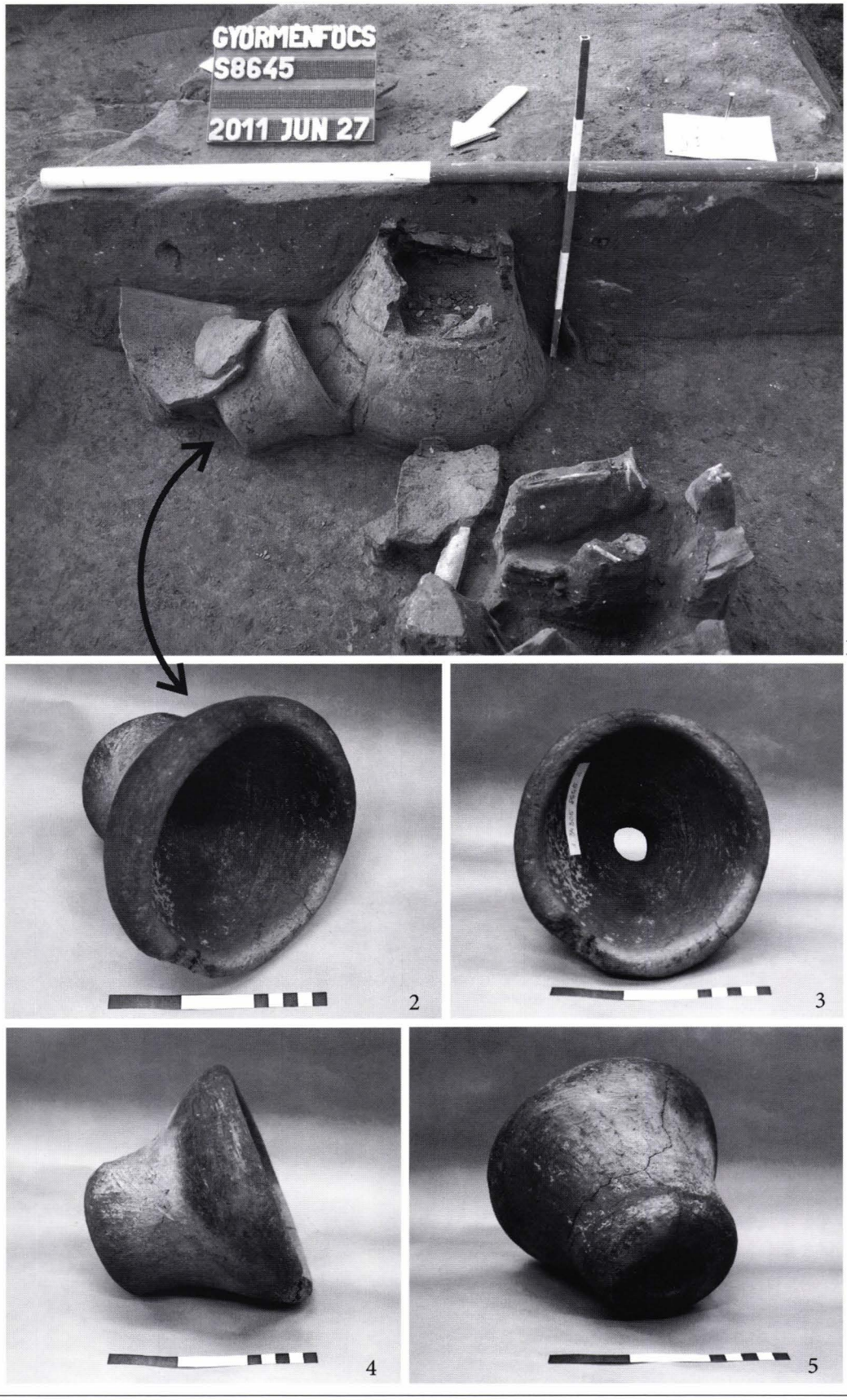

Plate 5. Ménfőcsanak, tuyere from the structure no. 8539/8645.

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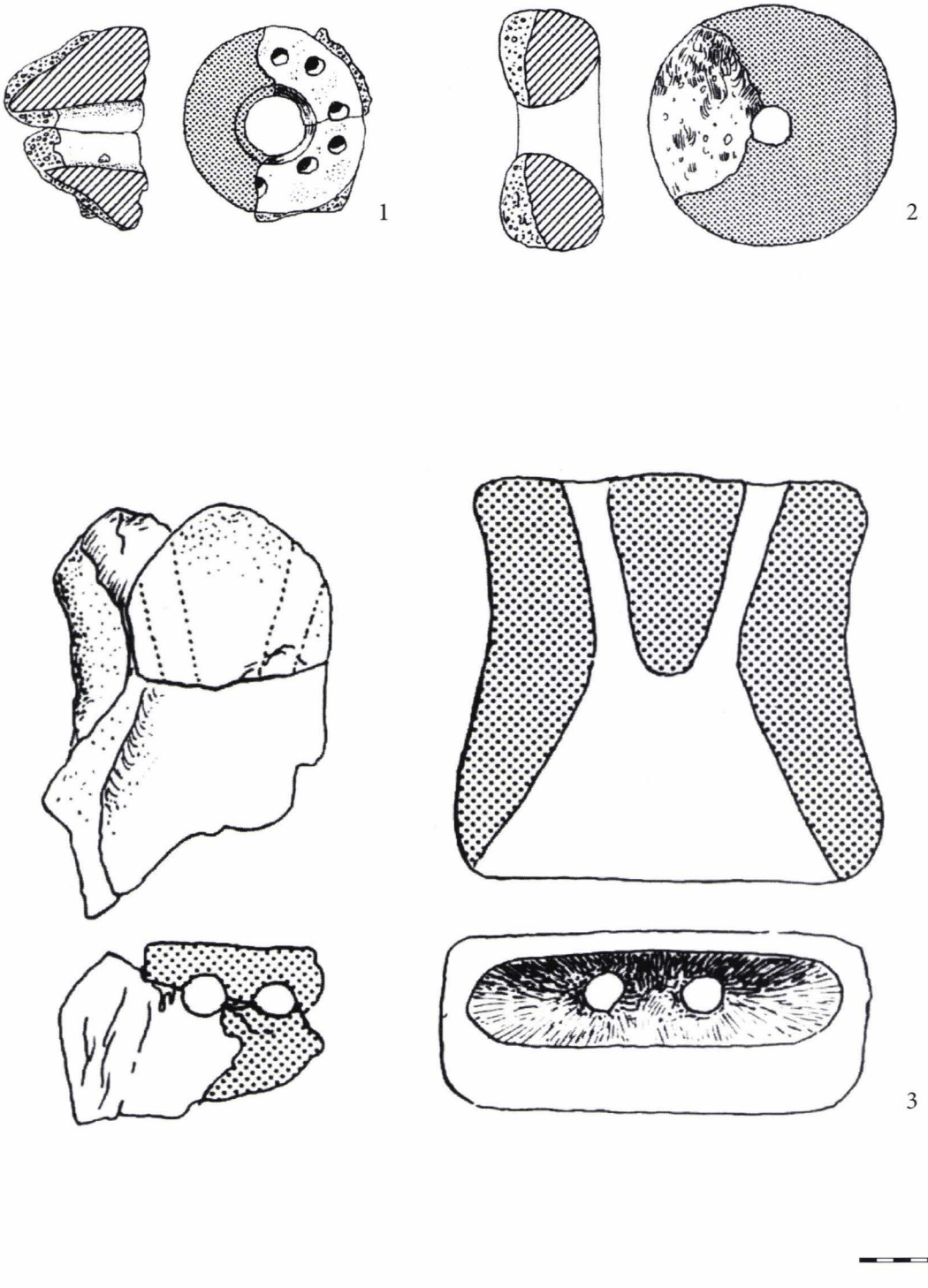

Plate 6. Conical and disc-shape tuyeres (after Pleiner 2000).
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A Decorated La Tène Sword from the Budapest–Csepel Island

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Keywords: Late Iron Age, cemetery, inhumation, cremation, weapons, sword, scabbard

In 2004 the Municipality of Budapest decided to build the Central Waste-water Treatment Plant at the northern point of Csepel Island (Pl. 1/1). Trial excavations in 2004 were followed by rescue excavations in 2006–2008. Almost 13 hectares of researched area revealed a total of 900 archaeological features and stratigraphic units, even though the fill was 3.5–4 m high at some parts and the lower strata had been disturbed several times due to gardening activities, soil extraction, bomb craters from World War II, deposits of hazardous waste, and eventually the in-filling of the whole area (Horváth 2005, 177–185; Horváth *et al.* 2007, 216–232; Horváth–Endrődi 2008, 200–202).[1]

With regard to the results of the decades of excavation work led by the Budapest History Museum, we have quite an extensive knowledge of the richness of the material on Csepel Island. It seems it was almost compulsory for the various prehistoric and Migration period cultures to appear in the areas along the banks of the Danube. However, the finds dating to the LT B–C period, previously appearing only as stray objects at sites in Budapest, were a surprise.

During the 2004 trial excavations, in Trench 4 (Pl. 1/2), apart from the usual prehistoric settlement features, oriented north-south, a number of Late Iron Age Celtic inhumation graves were found. Further digging brought to light several nearly square-shaped patches, which were mostly cremations belonging to the same culture. As more and more Late Iron Age graves appeared, and the majority of these ran under the wall of the trench, it became necessary to widen the site. After the extension of the area, a total of twenty contemporary features were revealed, while in 2006, during the complete excavation of the area of the waste-water treatment plant towards the east, a further 87 features connecting to the cemetery were excavated. Among the total of 107 features, 86 are graves (47 inhumations, 21 cremations, 18 currently indeterminant having been disturbed in antiquity), 5 are cenotaphs, and a further 18 stray finds which were found scattered between the graves, presumably as result of looting (Pl. 1/2). The graves were located on a more or less North–South oriented terrace that had formed on the high flood plain as a result of the Early Holocene cut of the Danube (Schweitzer 1992, 9–13). Based on the characteristics of the terrain and the location of the features, one can say that the site has been fully excavated, even though the eastern side of the construction area could not be excavated at its full length due to an almost five-metre-wide security zone next to the slurry wall built for flood protection. The east-west oriented trenches of the trial excavation in 2004, which towards the east extended into the site of 2006, did not reveal any further Celtic graves.

1 The excavations were conducted by the Department of the Prehistoric and Migration Period of the Budapest History Museum. Excavation leader: Attila M. Horváth. Other members of the team: Anna Endrődi, Borbála Maráz, László Reményi and Zita Tézer.

Iron Age Crafts and Craftsmen in the Carpathian Basin, 2014, p. 161–170

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The diagonal negative trenches cut closer to the lines of the suburban railway of Csepel indicated a deeper lying swampy area.

The majority of the finds excavated at the cemetery were mainly poorly preserved. The reasons for this were partly the already mentioned contemporaneous lootings of the graves, and other disturbances, while on the other hand, the change of climate following the cemetery's use, the continuous fluctuation of ground water, and the moisture seeping down into the soil from the loose fills that presumably also contained in certain sections dangerous chemical materials.

The skeletons from the inhumation graves at times had disappeared entirely and often were incomplete. Several graves did not contain any bones at all, but apart from five, they all contained finds. Thus, apart than modern disturbances, we can rightly assume that contemporary grave robbing had been carried out as well, which could be detected among both types of burial rites.

The previously known significant Celtic find groups and stray material found in Budapest mostly belong to the Late La Tène period, dating primarily between the first century BC and the first century AD. The rare earlier Celtic sites, apart from the early Celtic settlement excavated in the area of the Late La Tène pottery workshop at Békásmegyer (Hunyady 1944, 129, T. LXXVIII), are mostly represented by only stray finds (for the distribution and the list of the sites see: Horváth 2013, 101, 2. kép).

Although the conservation of the finds from Csepel is still in progress, based on the types found among the finished pieces it can be rightly supposed that the objects found in the cemetery were most probably in use from the end of LT B1 until LT C1 or between the second half of the fourth and the third century BC.

Certainly, due to the reasons already mentioned, complete analysis and description of all the graves or the whole of the excavated material cannot be attempted here. But this is not our goal. This paper will concentrate on the weapon graves. In 2004 and 2006, next to two stray finds, fourteen graves contained weapons. Eight swords have been found in all, three from inhumation graves, four from cremation graves and one from a pit. Six of the graves with swords also contained spearheads.

In inhumation grave no. 164, next to the extended skeleton, a straight sword and two small spearheads were found accompanied by a whetstone. There were no signs of a shield (Pl. 2/1). In inhumation grave no. 282 a straight sword and a spear were found, and some fragments of a shield; there were no shield bosses (Pl. 2/2). In inhumation grave no. 397, two long thin spears that had oxidized together lay next to the skull of the skeleton. The grave did not contain a sword or a shield. In the case of the latter two graves it cannot be ruled out that the lack of the objects mentioned was due to disturbance (Pl. 2/3). In inhumation grave no. 483, only a straight sword and a fragment of iron survived; even the bones were missing (Pl. 2/4).

Cremation grave no. 149 contained a straight sword, a twisted and studded sword chain, the fragments of a one-piece boss and shield board, a large, leaf-shaped spear, a bronze bracelet and an iron bracelet (Pl. 2/5). In cremation grave no. 154 next to the bent sword, a fragmentary shield boss, a spearhead, and from the grave fill, fragments of a 'loop-in-loop' bronze sword chain also came to light. No shield fragments were found, but a completely corroded conglomerate is still being separated (Pl. 2/6). Cremation grave no. 234 contained a bent sword and a spearhead (Pl. 2/7). In cremation grave no. 369, next to the bent sword, which had almost totally corroded into a lump, a shield boss, a spike, a whetstone and a twisted sword chain were found. Apart from the weapons, a large amount of pottery was also excavated from the cremation burials, including large storage vessels. In grave no. 369, beside the grave goods there were a lot of animal bones (almost an entire pig), probably partially consumed during the funeral feast. Among the bones there was also a big knife (Pl. 2/8).

The location of a broken spear, which is inventoried as stray find no. 217, has not been determined so far; it might have belonged to a nearby grave which had been robbed. In the case of feature no. 436 (Pl. 2/9) a sword bent into an almost regular rectangle was deposited in a small, individual pit.

One of the most important find assemblages belongs to the circle of cremations. In the case of inhumations buried with weapons in the cemetery, all of the swords and spears were deposited in the grave without bending. All of the cremated graves containing weapons were characteristic of the LT C period. Apart from the bent swords and other weapons inside the graves, there was usually a large amount of pottery offerings as well, including large storage vessels.

However, grave 149 is different due to both the range of offerings and the burial rite followed. In this grave, a sword had been deposited, along with pottery and the cremated male remains (Pl. 2/5).

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The ceramic material from this grave would deserve a discussion of its own, both as a whole and perhaps even individually. Two small, pentagonal bellied and burnished jugs, a hand-made plate, and a slow wheel-thrown plate were placed in the grave, as well as two large storage vessels. One of the latter two was possibly a narrow necked, bulging bellied, hand-made vessel with a slightly everted rim, barely fired, which was probably made specifically for the burial. The collapsed remains of the vessel, disturbed by animal burrowing, however, cannot be reconstructed. Another vessel possibly also prepared for the burial, which can be regarded as the most significant find in the whole cemetery. The rather badly preserved, barely fired vessel with a complete human form sculpted on both handles is, to my best knowledge, the only analogue of the pseudo-kantharos from Blandiana (Maroskarna) known today (*Kincsek* 2005, 48; Rustoiu 2008, 33, 35, fig. 15; Rustoiu–Egri 2011, 54, fig 20; 21).

The metal finds of the grave 149 attest the fact that the deceased person once owned a large, oval shield with an iron binding bent in a U-shape bordering its rim (Pl. 3/1–2). A large, one-piece boss was placed at in its centre, while its mounts were attached with large, semi globular headed studs. Elements of clothing were only suggested by two fragmentary bronze and iron bracelets that had burnt on the pyre, and a rather fragmentary and deformed, arched iron object, found among the ashes. The latter might have been a fibula fragment. Among the weapons, the large, leaf-shaped spear, strengthened lengthwise by a rib, and with a narrow socket, was much more a symbol of power than an implement of use (Pl. 3/4).

The 0.75 m long sword (Pl. 3/5) also demonstrates the status of its owner. The scabbard of the weapon, which had burnt on the pyre and arched slightly on its lower third, is closed by an applied chape-end with double inset discs, with a horizontal chape-bridge on its reverse – the Hatvan-Boldog sword type (Pl. 4/1–2). Close to the variant of the Kosd-D type, but slightly different, analogous to the one found in the grave no. 85 in Monte Bibele (Pl. 4/3), or Karaburma grave no. 22 (Blečić Kavur–Kavur 2010, 58, Sl. 1); Dubnik grave no. 19 (Bujna 1989, T. XX/8); or the finds from Aradu Nou (Rustoiu–Ursuțiu 2013, fig 9).

Running along the overlap of the front and reverse of the scabbard bent from an iron plate, a deep line emphasizes the edges. The arched rim of the Duval-A2 type scabbard mouth (Duval 1975, 9) is closed by a narrow double rib (Pl. 4/4–5), which technique is also known from grave 1 at Kosd (Szabó–Petres 1992, pl. 27). Below it there is a frontal reinforce of two discs connected with a horizontal bar. One shows the signs of an inlay completely saturated with iron rust, the composition and the function of which cannot be determined at the moment (Pl. 4/6). However, the cavity in its centre may indicate that it was intended to secure a rosette in place. A similar case of a missing disc rosette can be observed on the sword found on Gáva–*Katóhalom* (Petres–Szabó 1985, 89, pl. I/2–3; II) and there are other examples where such discs were found (Berecki 2010, fig. 1.)

The rings fastened together with chains twisted into shapes of 8, corroded onto the middle of the scabbard can be identified as the elements of the sword chain (Pl. 3/3). The uncovering of the sword chain, also made up of chains twisted into shapes of 8, from the fine sand of the grave soil mixed with the corrosion products is still underway. The problem that had already appeared during the cleaning of the sword and spear – separating the original object from the iron-oxides – affected the sword chain to an even greater extent. The rather badly preserved objects can only be cleaned mechanically; chemical cleaning was out of the question with regard to metal objects without an iron core, while the attempt to use laser cleaning on a surface covered with fine silicate grains was of no effect either. The texture of the chain elements which had melted into an amorphous lump could only be identified with the help of an X-ray analysis, which also indicated that there was a hook at the end of the chain (Pl. 4/8).

The bow of the loop on the back of the scabbard had disintegrated; the upper plate could not be recovered from underneath the corrosion. The lower plate is round with a stud, with an acute-angled triangle shape below it (Pl. 4/4–5).

Except for the basic technological aspects of the blacksmith's trade, the process of manufacture cannot be reconstructed. The separation of the scabbard and the blade is not possible at present, as it could lead to the damaging of one if not both pieces. From the section of the sword, which had broken into four parts in the grave, one can deduce that the blade with a rhomboid section had been double-edged. Due to oxidation, the blade had separated at the broken sections, which indicates that it had been bent at least once during forging, or it might have been hammered together from two individual plates (Pl. 4/7), something which has been observed in the case of other swords in the Csepel.

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Regarding the decoration of the scabbard front plate, one can observe below the rings connected by bars, a pelta motif drawn with a light double line, which is complemented by floral vines and palmettes. The centre field of the composition is ruled by a triangle framed on top by a vine dividing into two, and a pair of intertwining vines on each side. The S-shaped double lyre motifs recall the symmetry of the dragon-pair ornamentations; however, the motifs themselves are not symmetrical, but repeat each other (Pl. 4/4–5). The double lyre motif is well known in early Celtic art. Their widespread use is characteristic for the second half of the fourth century BC and they have a significant role in the so-called *Végétal continu* or Waldalgesheim style (Szabó 1976, 25–37; Megaw–Megaw 2006, 367–393). Nevertheless, during their application, they appear almost always in symmetrical and parallel forms, similar to the zoomorphic or dragon-pair motifs.

The simple double lyres are mostly found on ceramics, sometimes on other metal objects; but they are very rare on swords, and apart from some Transylvanian finds (from Tărian and a stray find from Transylvania, see: Szabó–Petres 1992, pl. 97, cat. no. 99–100), always in various compositions.

The composition points towards the dragon-pair style. In the case of the Navarro Type II dragon pairs, although they are vertical, the upper bodies of the facing figures usually form a triangle, which is similar in composition to the sword decoration of Csepel. They only vary in the symmetry. The question arises whether the asymmetry of the double lyre on the Csepel piece was intentional, or was it a mistake of the master? The pelta motif points towards the roots of the Waldalgesheim (*Végétal continu*) style, while the dragon-pair points towards Northern Italy and at the same time, the reinforced plate with discs and its presumed missing rosettes indicate the 'Plastic' style and the west. Above all, the ornamental technique shows similarities with some sword types from Kosd, which may lead us towards the Swiss sword types.

Even if our analysis leaves open a number of questions and raises several possibilities of interpretations, it emphasises, however, that during the study of the find material from the Carpathian Basin, we can encounter various versions, sometimes derivatives, and even incorrect examples from a single common family of motifs, the majority of which had definitely been manufactured in the workshops of the Central Danube area.

There are simply so many variations possible in such an extensive *koine*, that one should be happy to find some similarities at all. Thus, we cannot be too far from the mark, when we say that the sword from Budapest–*Csepel* is a unique object of Celtic metal workmanship, if only because, based on the study of the associated finds, it can be stated with certainty that in the whole world there are no two identical Celtic swords.

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List of the plates

Pl. 1. 1. Northern point of Csepel Island: the location of the site; 2. Details of the excavation site plan with the Celtic graves.

Pl. 2. 1–4. Inhumation burials with weapons (selection): 1. Grave no. 164; 2. Grave no. 282; 3. Grave no. 397; 4. Grave no. 483; 5–8. Cremation burials with weapons (selection): 5. Grave no. 149; 6. Grave no. 154; 7. Grave no. 234; 8. Grave no. 369; 9. A bent sword from the feature no. 436.

Pl. 3. 1. Grave no. 149, fragment of shield boss; 2. Body of shield, 3. Suspension chain; 4. Spearhead; 5. Sword.

Pl. 4. 1. Grave no. 149. Front of the chape-end; 2. Back of the chape-end with the remains of chape-bridge; 3. Chape-end from Monte Bibele grave no. 85 (after LEJARS 2008); 4. Detail of front of scabbard, with the engraved decoration; 5. Detail of the back of the scabbard, with remains of the suspension-loop; 6. Position of the missing rosettes on the reinforce bar; 7. The fractured surface of the scabbard and blade showing the gap between the two plates; 8. X-Ray photo of the suspension chain with the belt hook.

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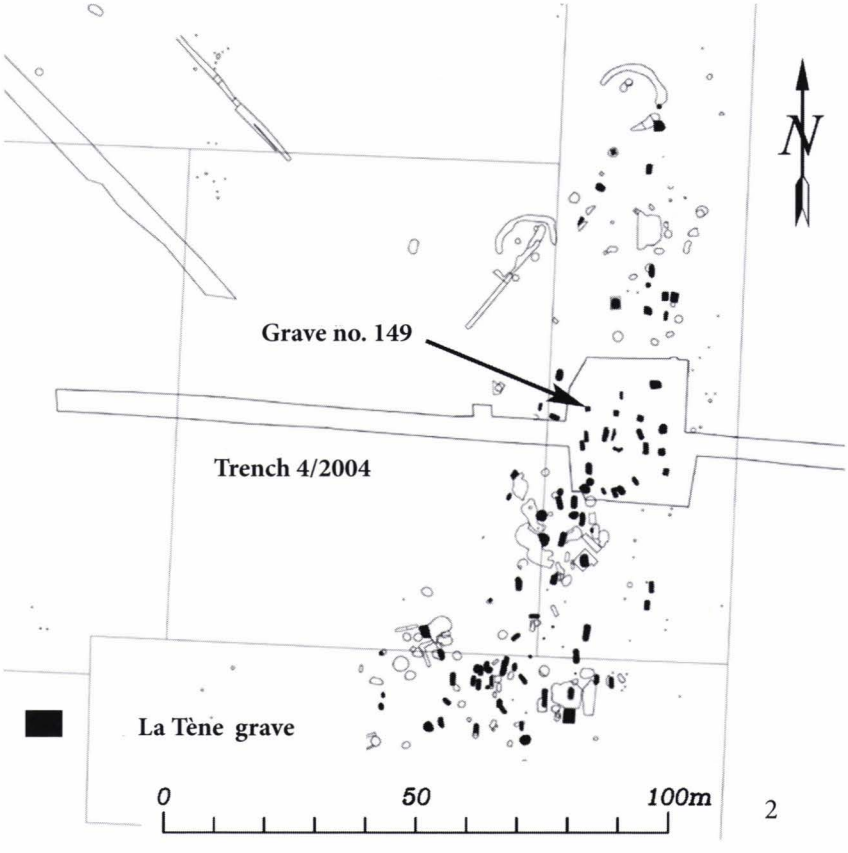

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Plate 1. 1. Northern point of Csepel Island: the location of the site;
2. Details of the excavation site plan with the Celtic graves.

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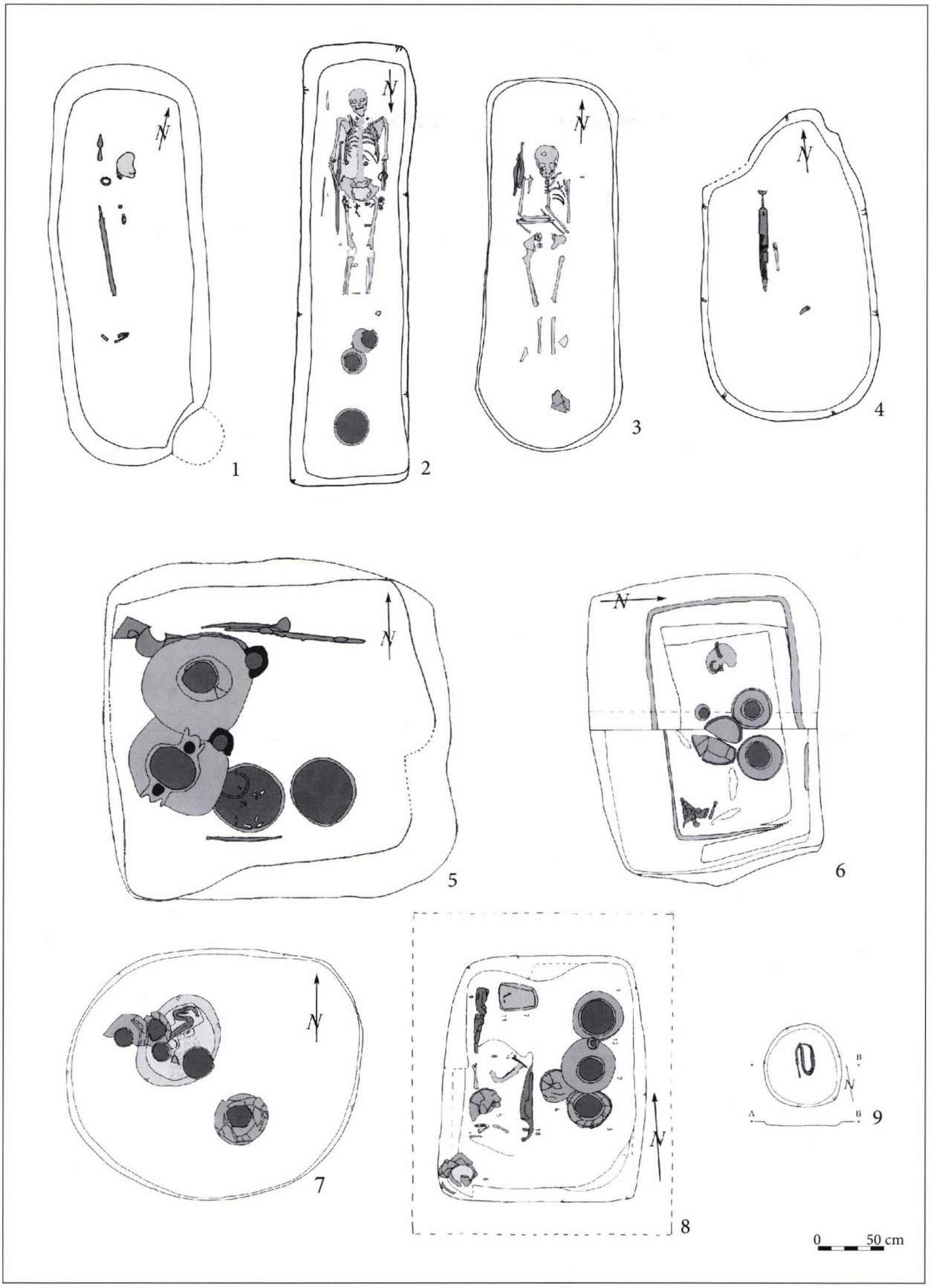

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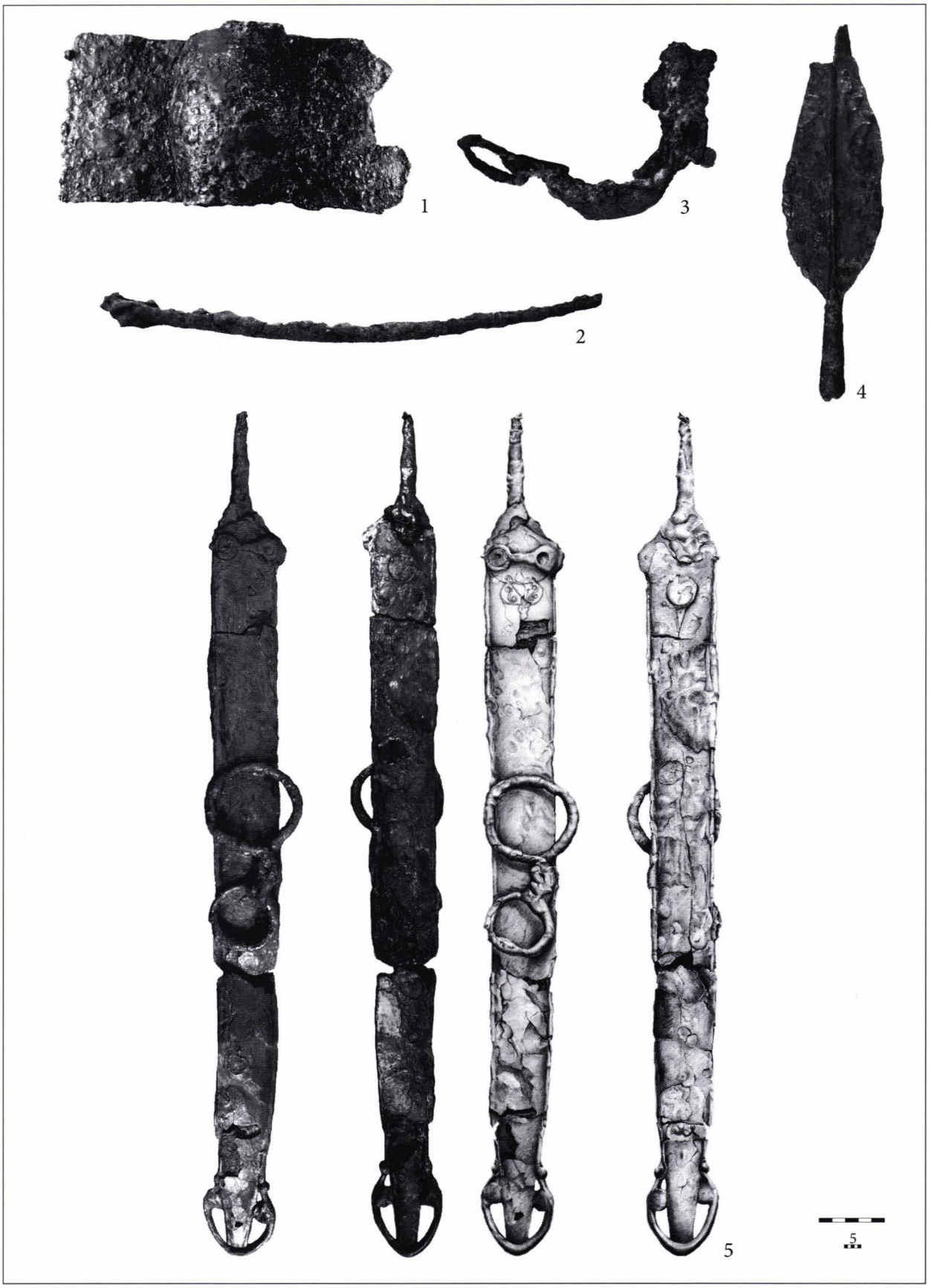

Plate 3. 1. Grave no. 149, fragment of shield boss;
2. Body of shield; 3. Suspention chain; 4. Spearhead; 5. Sword.

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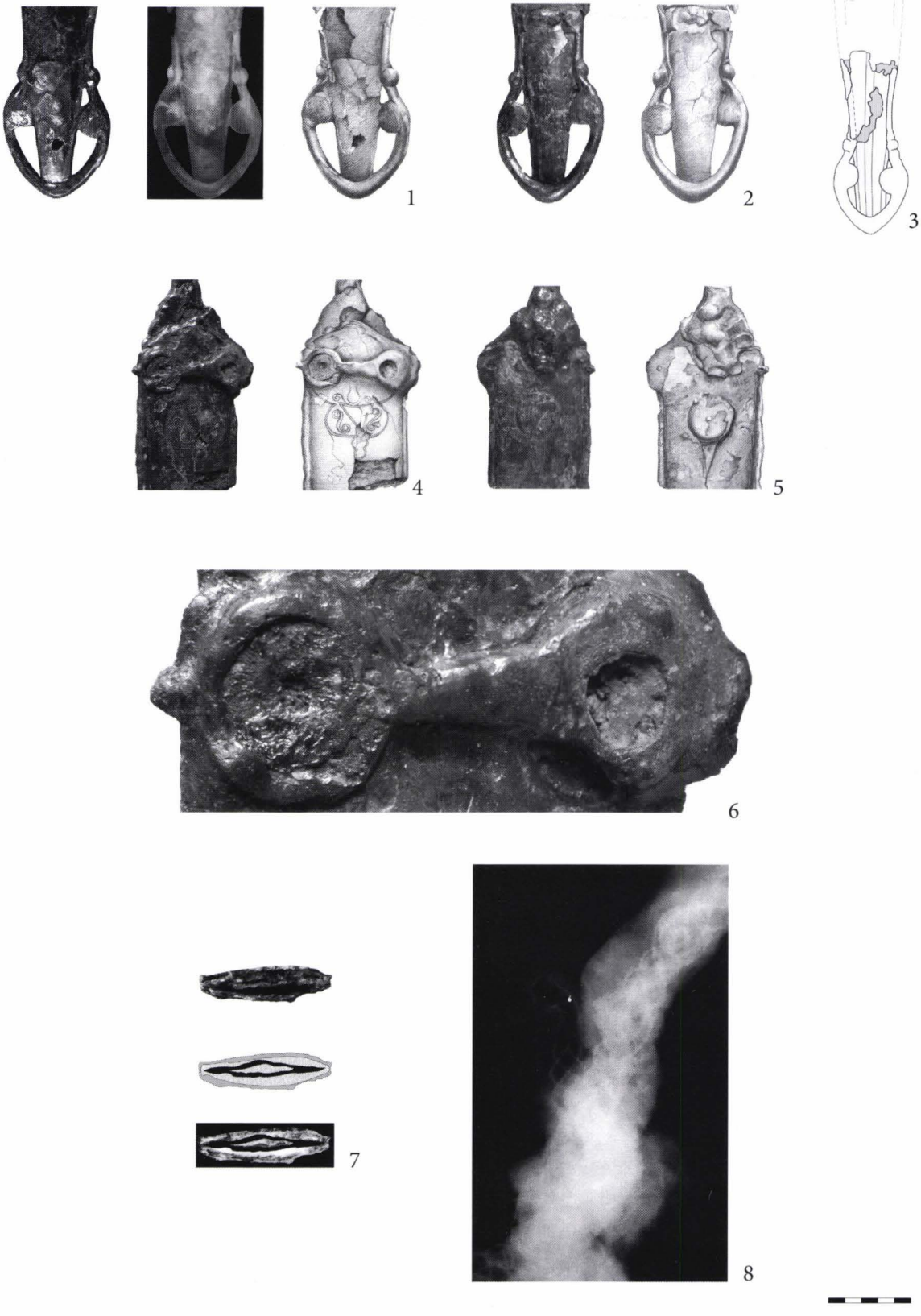

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Remains of a Pottery Workshop (?) from the Upper Tisza Region

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In 2004 near Nyíregyháza (NE-Hungary) rescue excavations preceding the construction works of the Eastern By-pass Road were conducted within the framework of an international cooperation by archaeologists of the Jósa András Museum (Nyíregyháza) and the County Museum of Satu Mare (Satu Mare), the Museum of Baia Mare and County Museum of History and Art in Zalău. At the northern part of Site 27 from Nyíregyháza–Oros–*Úr-Csere*[1] a large, several hundred meter long and intensively inhabited a settlement of the Imperial Age was investigated, where beside Sarmatian graves, three buildings (no. 785, 798 and 805) were unearthed containing La Tène material (Pl. 1/1). Most of the pits found in the surroundings of the buildings did not contain find material or only animal bones therefore some of these pits might had belonged to the houses or were contemporary with the buildings. In the following paragraphs, only the certain Celtic period features will be discussed (Pl. 2).

The orientation of the features was E–W. The two smaller building of the assemblage (no. 798, 805) were situated nearly in the middle of the 60 m wide excavation area, while the third one was closer to its western edge. The houses had a roof supported with two pillars and a cross beam as generally used in the La Tène period. There was a shoulder running around at the edge of feature 785, so this house was somewhat larger (3.40 × 3.86 m, and together with the shoulder: 4.10 × 4.32 m) than the other two. The latter ones were almost identical: 2.78 × 3.90 m and 2.80 × 3.60 m. In the larger house a plastered floor lined with grey sand and repaired several times were recorded. There was no floor in the two smaller buildings situated close to each other. The filling of all the three buildings consisted – at least at the topside – of grey sand mixed with a few yellow or black particles. The 0.30–0.35 m thick posts were dug 0.58 m deep in the larger building, while in feature 798 the depth of the post-hole was 0.50 m and in feature 805 it was 0.70 m.

Feature 798 contained standard LT C pottery forms of pottery both wheel-thrown and hand-made though in lower quantity than usual. In feature 785 there was an iron knife with a bone handle kept in good conditions, found on the floor (Fig. 1). The relatively rich find material included big pieces of broken vessels, suggesting that the inhabitants left the house without collecting all the usable objects.

1 At this site a Romanian team conducted the excavation led by archaeologists I. Bejinariu, R. Gindele, Al. Matei and H. Pop (Gindele *et al.* 2005).

Iron Age Crafts and Craftsmen in the Carpathian Basin, 2014, p. 171–182

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The pottery material can also be dated to the LT C period, and consists of wheel-thrown and hand-made pottery, the ratio of which is around 3:2.

Fig. 1. The knife from feature 785.

The burnt feature 805 presented several interesting particularities (Pl. 1/2). The burned red layer could be easily traced at the wall and floor of the building. As a consequence, the filling also included a brown layer with burned particles, which indicates a higher content of organic materials. The floor of the building was scattered with sherds, and it was possible to observe that several of them belonged to a certain vessel. A thorough method was chosen for excavating and recording this feature by setting out a 0.50 m grid inside the building and recording and collecting the finds according to the grid. Due to this, the position of several vessels could be reconstructed. This feature was different from the other two also in its construction; a 1.22 × 1.25 m large pit protruded from the south-eastern corner and inside the building there was an additional large pit measuring 0.92 × 0.95 m in line with the previous, along the eastern wall. The corner pit was filled with charcoal and ash up to the current top of the building, despite the fact that this filling was not characteristic for the whole of the house. In the case of the other pit, a mixed filling was observed, a 0.20 m thick carbon-ashy layer on which a brown layer with red particles (similar to the level recorded above the sherds) was lying. It seems that the inner pit was used for sedimentation, and the corner pit functioned as container for charcoal and ash.

At the floor of building two shallow post holes were found, 50 mm deep and 200 and 300 mm in diameter. Based on their depth they could hardly belong to the structure of the building, but rather they must have been the support of some interior furniture, such as a bench standing at the sedimentation (?) pit.

A narrow and steep shoulder running along the eastern side of the building could have belonged to the structural elements of the feature, perhaps serving as a stair. Yet this remains uncertain, because in many cases the numerous animal burrows make it difficult to outline the edge of some features in the sandy soil of the Nyírség region. On the other hand stairs are frequent structural elements of the La Tène features (for a recent discussion see: Tímár 2007, 209).

Surprisingly, only few identifiable remains of the burned-down structure could be observed in the filling of the feature. Only the numerous burned red particles refer to the fire, but neither large pieces of plaster, nor serious amount of charcoal were found. That is to say, it could be just a simple structure covered with a roof, without massive supporting walls, since even a plank wall would leave an identifiable amount of charcoal. Judging from the post holes found in the middle of the shorter sides, the roof could have been half-sided or a ridge-roof. Accordingly, one can assume that this building was not erected for residential purposes.

Pottery was not fired evenly or uniformly; some of them were overfired, which is natural in the case of a house fire, while other fragments were not fired at all (Pl. 3/1–2). Occasionally one of the edges of the vessel reconstructed from fragments is fired well, while the other one was underfired. Frequently imperfections on the sherds can be observed which could only have occurred before firing (Pl. 3/3–4). Frequently pieces have been deformed in the process of firing (Pl. 3/5). While in some cases the explanation could be the secondary firing of the ready vessels; some examples listed earlier show that unfired vessels were stored in the building. This explanation is also supported by the fact that in the case of some vessels, more precisely bowls, the base was not finished (Pl. 3/6). The thin walled upper profiles were completely shaped, but their bases were not elaborated. This is not typical for Celtic pottery.

In the find material we meet large vessels and bowls (Pl. 3/7–12). Large vessels belong to two basic types: ones with a wide and low shape and to a slim and high form. The bowls are a little varied: there is a series of small bowls. All of them have short necks, everted rims and biconical bodies. Larger bowls have annular rims and globular shoulders, or everted rim and short neck with biconical body, or conical, high neck with everted rim and oblate lower part. These shapes are common in the Late Iron Age of the Carpathian Basin in the third–second centuries BC. On the basis of the relatively high number of bowls with annular rims the assemblage can be dated to the second half of this period, that is to say, to period LT C. Based on their profile and, perhaps, technological aspect some fragments can be dated to a later period (see: Almássy 2009). From the point of view of profile it is important to note that large quantities were made only from a few types.

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As it has already been mentioned, due to the method of collecting the material by small units, in many cases it was possible to determine the precise location of certain vessels. It can be observed that both among the large vessels and the bowls there were some situated along more or less in a line. Logically, we can conclude that vessels were standing on a shelf.

Based on the field observations, it can be summarized that this feature was a workshop where vessels prepared for firing (ready pieces) and ones waiting for final shaping (with unfinished bases) were dried on a shelf. Judging from the two inner pits, not only drying of the clay, but also some sort of actual potting went on here. In this respect, the shallow post holes found beside these pits could have belonged to some kind of bench. Perhaps this bench was used as a support for a small wheel on which the final shaping of the vessel bases was carried out.

But what was the building like? If it was a house for drying vessels, it must have had a regular roof; alternatively solar radiation would have damaged the vessels. Most probably we can think of ridged roof. Based on the field observations (only two regular, deep postholes; no serious amount of charcoal or plaster), the building did not have massive walls. The drying function even can explain that it did not have side walls at all (Pl. 4/1). This theory has one problem – the internal space is small. The problem can be eliminated using the results of another concept related to the experimental reconstruction of an early medieval house, which points to the possibility of building up firstly the roof, to make it stable and then to dig out the pit under it (Sabján 1999, 139–140, 29. kép). In this way the roof could have been made as high as needed (Pl. 4/2). The existence of a comparatively high roof is supported also by the 70 cm deep post-holes.

The other possibility is that the building had a light, wickerwork wall with the help of which the roof could be elevated so that the potters could move more comfortably in the building (Pl. 4/3). Such an unplastered woven wall provided the ventilation of the house that fostered the drying of the vessels. That no traces of the wickerwork wall were recorded during the excavation can be explained by the soil conditions, but it may also be that vertical branches were attached into the beams (Pl. 4/4). The joint of the branches and beam could have been strengthened by plaster in order to make it more stable (Pl. 4/5). A possible example of jointing together the roof and the walls (Pl. 4/6) is given by examples of vernacular architecture (Régi faszerkezetek).

The ridged model without walls would imply features regarding the place and shape of the shelf. It could not have been too high, because at its side it would have overlapped with the roof. This explains why it was not higher than three stories. The shelf must have been standing at the shorter side of the building, because this was the best way to ventilate it, and that is how it was possible to put vessels on the upper level. Taking into consideration the ideal exploitation of space, a 0.02 × 0.20 m high and 0.60 m wide shelf can be presumed standing on legs c. 0.20 m high (Pl. 5/1). This width would make it stable and vessels could be packed in two rows. Since more than 40 vessels were discovered in the building, any other configuration would not accommodate this quantity of pots. Large bowls (with a maximum diameter around 0.25–0.30 m) could have been placed on the lower shelf while larger vessels pots would have stood at the top of the structure. These were surrounded by smaller bowls occupying the rest of the free space. However, this hypothesis is not really sustainable because the large vessels should have been placed on the top, which would have made the shelf less stable. This problem can be solved with not one, but two shelves (Pl. 5/3). Judging from the disposition of the pottery (Pl. 5/5), the first one stood by the wall with the large vessels, while the other one with the large bowls could have been situated beside the inner pit.

If a roof supported by wickerwork is accepted, one can assume a larger interior space, so it would have been easier to locate the shelf. At the same time, it is still holds true that large bowls and tall vessels stood separately from each other, and small bowls were put at the place available beside tall vessels (for a possible solution se: Pl. 5/2). Of course, several smaller shelves could also have been situated within such a building (Pl. 5/4; Fig. 2).

A pottery workshop would connote the existence of a kiln at the site, but no such feature was identified and even traces of a Late Iron Age village are missing. This can be partly explained by the character of the excavation, since it was only possible to dig a 60 m wide cutting. The workshop and another smaller building was situated in the middle of this stripe area, while the larger one was found some 11 m from the western edge of the excavated area. That is to say, the settlement itself could have continued west of the excavation. There were no surface traces observed during the field walks, but this can be

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explained by the small size of the settlement. This is not surprising in the Upper Tisza Region, where Late Iron Age communities lived both in farm-like small settlements and bigger villages. In the case of the pottery kiln, it would be enough that it had been situated not 30 but 32 m from the workshop, thus it would have been outside of the excavation area.[2] Due to the large area excavations made in the recent years, there are already more data on the relationship between pottery kilns and dwelling area. In the wider geographical vicinity of the Oros workshop there are three sites from where pottery kilns were published recently: Mezőkeresztes (Wolf–Simonyi 1995), Sajópetri (Tankó–Czajlik 2007) and Kálmánháza (Băcueț *et al.* 2006). In Mezőkeresztes, different features were situated rather far apart or, 100–120 m from each other,[3] in Sajópetri most of the kilns (found in groups and also single ones) were at the south eastern part of the settlement, separately from the dwelling area, that is to say, in a workshop district (Tímár 2007, 201; Tankó–Czajlik 2007, 222). At the same time, in Kálmánháza the pottery kiln was observed amidst the buildings (Pl. 6/1).

Fig. 2. 3D reconstruction of feature 805.

Other examples for both situations can be cited from more distant regions of the Carpathian Basin. At Zalakomár the kiln was situated at the edge of the settlement (Horváth 2008, 109–110, 1. kép). At the site of Ordacsehi–*Kis töltés* the kiln was found in the middle of the excavated part of the settlement bearing a loose structure. Here a workshop district separated from the dwellings was suggested, similarly to the situation in Sajópetri (Honti *et al.* 2002, 26). That is to say, there is no absolute rule for the position of the pottery kilns inside the settlement.

Regarding the organisation of the potter activity itself, as industry in the Celtic Age it is questionable on what degree one should speak about 'big industry'. That is to say, what is the probability of a specialised potter being active at a settlement practically not even recordable at an excavation? The large vessels with thin walls, nicely elaborated surface and profiled bottom indicate a highly skilled craftsman near Oros. Recently the existence of 'pottery centres' producing large quantities of ceramics for trade, but also small workshops answering the demands of a single settlement was presumed (Szöllősi 2008, 336–337). According to these 2008 data only from the territory of Hungary we know almost 70 kilns from 40 sites. Their majority were found as a result of large-scale preventive excavations preceding big investments. This fact shows that we do not have more excavated kilns because of the territorial

2 A similar situation was observed at a relatively close Celtic site of Mezőkeresztes, where only one house (!) was found beside three (!) pottery kilns (M. Wolf's kind personal information).

3 M. Wolf's kind personal information.

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limits of the excavations (Szöllősi 2008, 327). To supplement Szöllősi's data, one can mention the kiln researched in Zalakomár, found on the territory of a small farm or manor (Horváth 2008, 109).

Another observation attesting to the existence of potters supplying their own village is that in several cases kilns or other features referring to pottery production are found at sites close to each other, e.g. Oros–Kálmánháza 16 km, Sajópetri–Mezőkeresztes 25 km (Pl. 6/2) –, in some other cases only to some kilometres from each other, like at Ordacsehi–*Kis töltés* and Ordacsehi–*Cserefőld* (Belényesy *et al.* 2007). If these potters produced vessels only for their village, it is understandable that they did not disturb each other's business. At the same time it is possible that they were specialised and produced different types of pottery, however the characteristics of the pottery shapes in the find material do not support this. We would rather suggest that versatile Celtic craftsmen were capable of working with different techniques and under different technological conditions, as it has also been proposed in the case of the finds from the kiln from Ordacsehi–*Kistöltés* (Horváth 2007, 193).

In conclusion, the feature from Nyíregyháza–Oros–*Úr-Csere* indicates that pottery production of the eastern Celtic areas was a specialised, but not necessarily large-scale industrial activity.[4]

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List of figures

Fig. 1. The knife from feature 785.
Fig. 2. 3D reconstruction of feature 805.

List of plates

Pl. 1. 1. Detail of the general area of the site Nyíregyháza–Oros–*Úr-Csere* (plan: L. Veszprémi); 2. Feature 805 (drawing: G. Beleznai).
Pl. 2. La Tène features. 1. Feature 785; 2. Feature 798; 3. Feature 805.
Pl. 3. Pottery from feature 805. 1–2. Unevenly fired vessels; 3–4. Pottery deformed before firing; 5. Pot deformed during firing; 6. Unfinished vessel; 7–12. Characteristic forms (drawing: G. Beleznai and Cs. Svéda; 1–6. without scale).
Pl. 4. Reconstruction of feature 805 (drawings: 1–5. G. Beleznai, 6. after Régi faszerkezetek).
Pl. 5. 1–2. Reconstruction of the shelves (drawings: G. Beleznai); 3–4. 3D reconstruction of the workshop; 5. The layer of sherds in feature 805 (circles indicate vessels).
Pl. 6. 1. Late Iron Age features at Kálmánháza–*Nagy-lapos* (plan: L. Veszprémi); 2. Micro region with the Late Iron Age sites from Oros (1), Kálmánháza (2), Mezőkeresztes (3) and Sajópetri (4).

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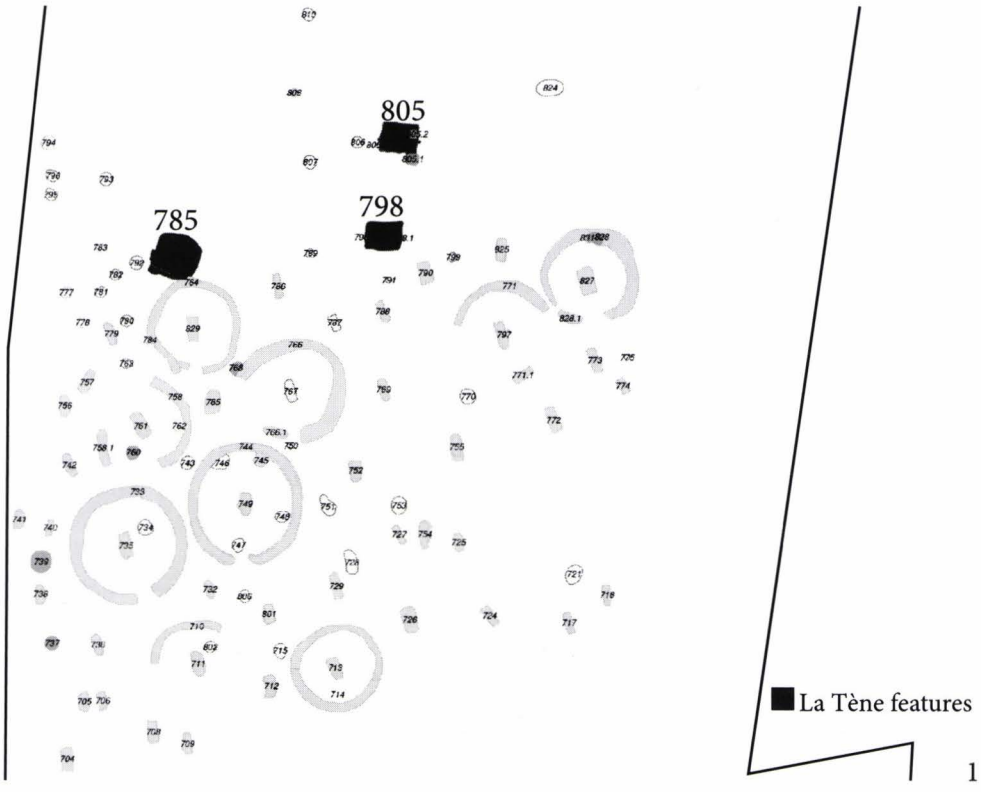

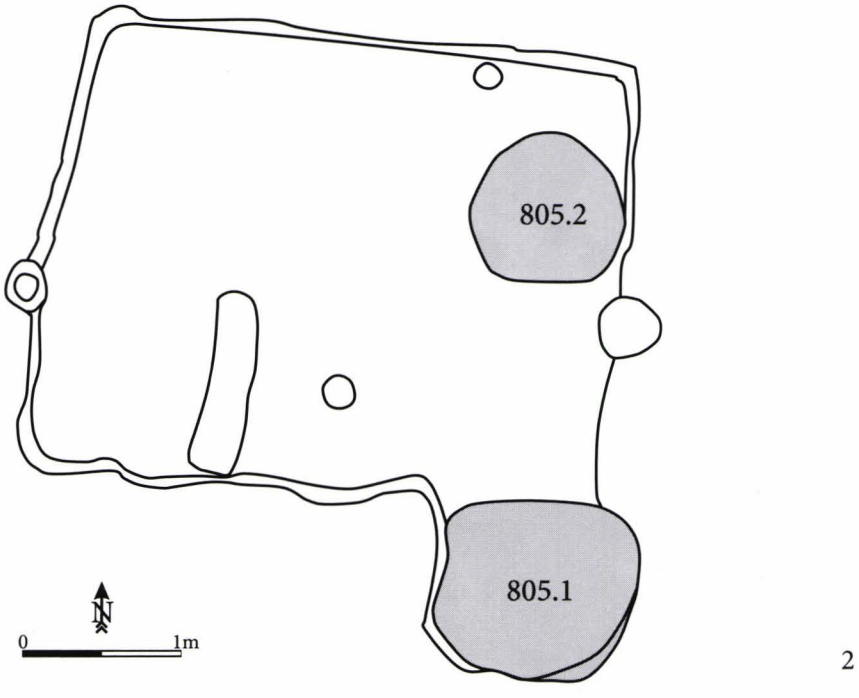

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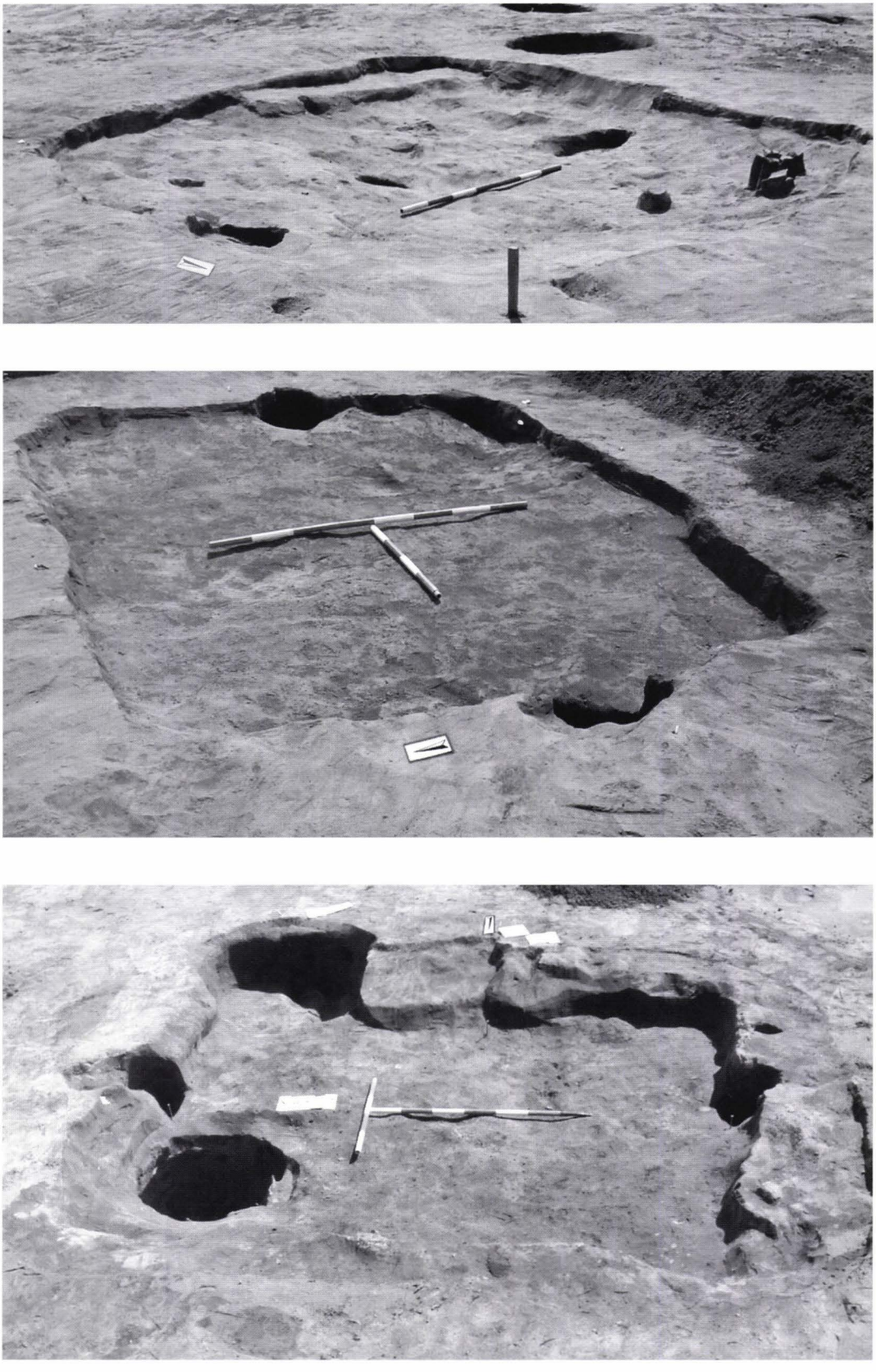

Plate 2. La Tène features. 1. Feature 785; 2. Feature 798; 3. Feature 805.

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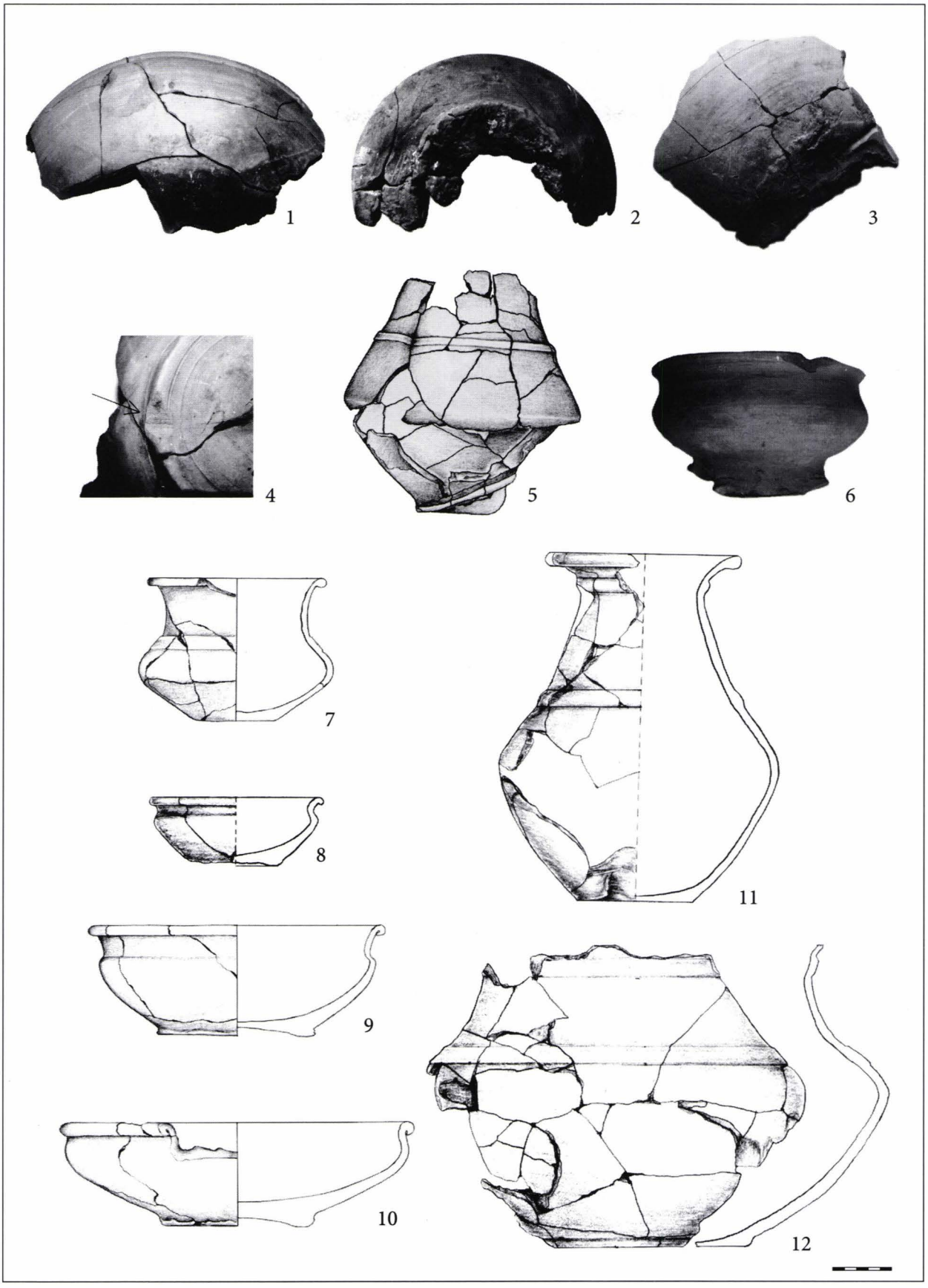

Plate 3. Pottery from feature 805. 1–2. Unevenly burned vessels;
3–4. Pottery deformed before firing; 5. Pot deformed during firing; 6. Unfinished vessel;
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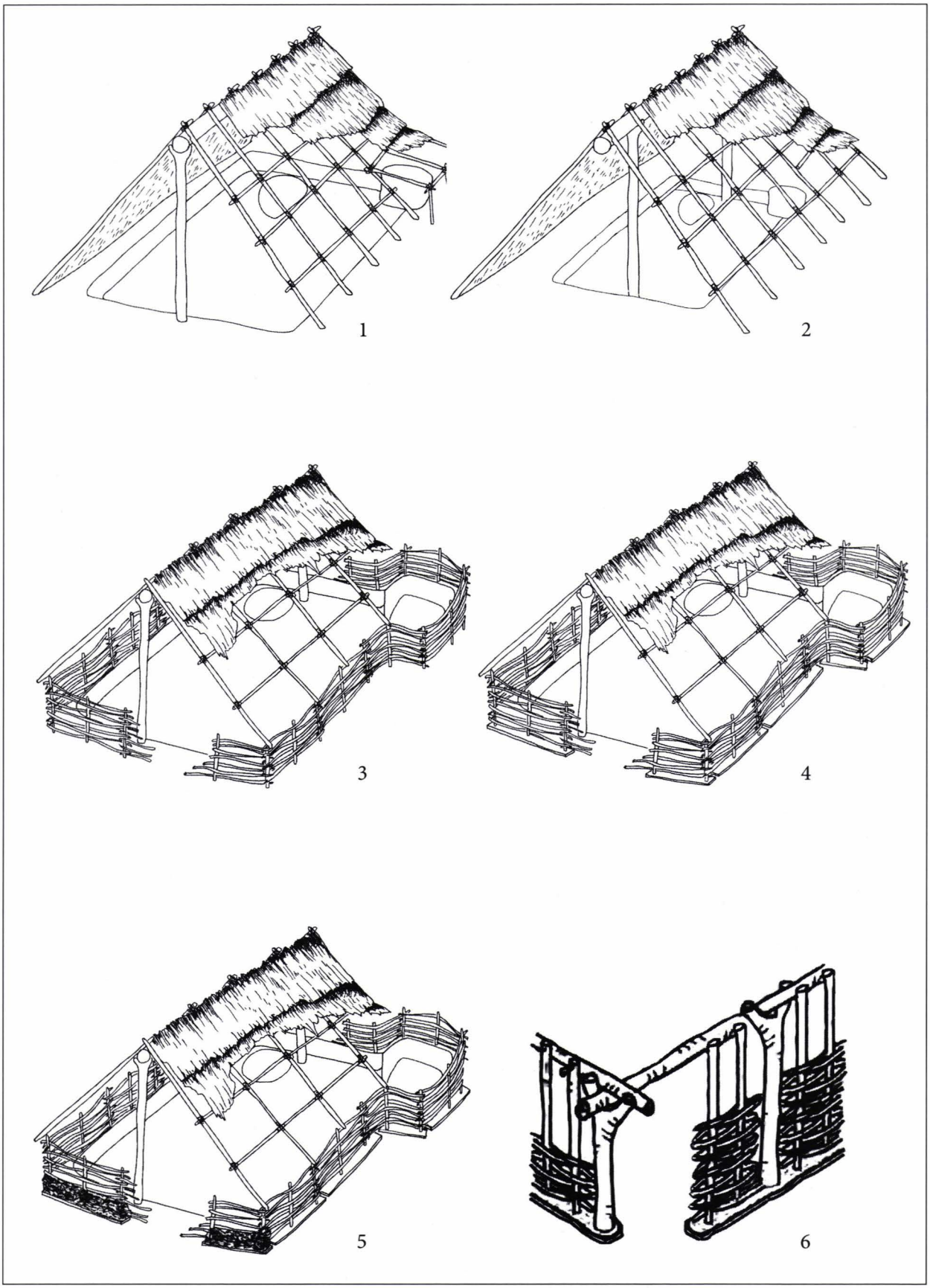

Plate 4. Reconstruction of feature 805 (drawings: 1–5. G. Beleznai, 6. after Régi Faszerkezetek).

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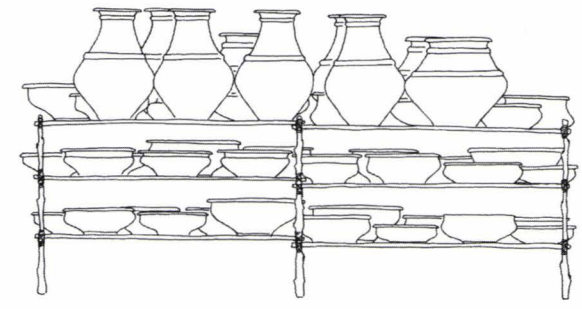

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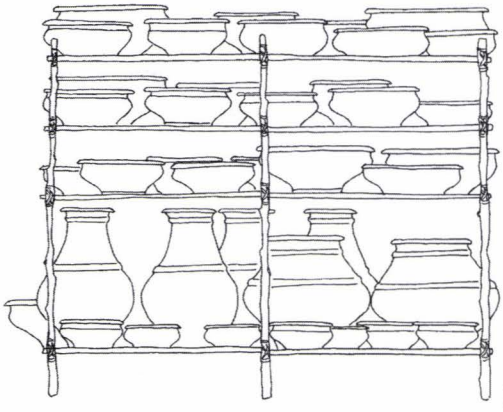

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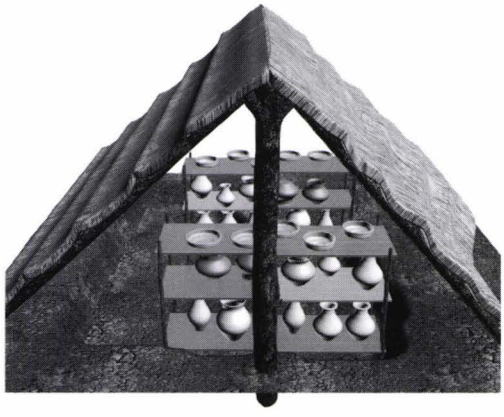

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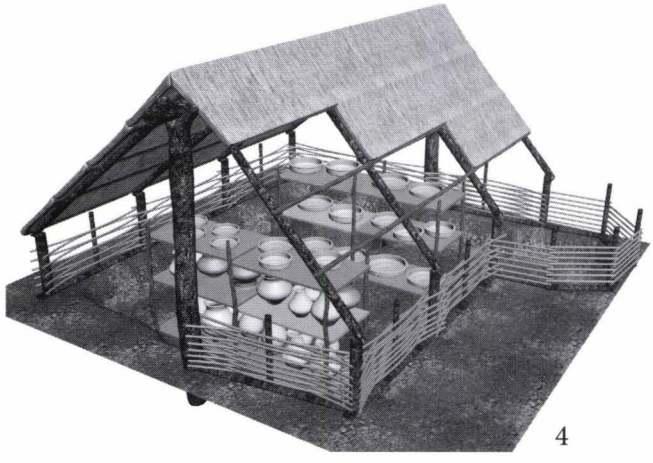

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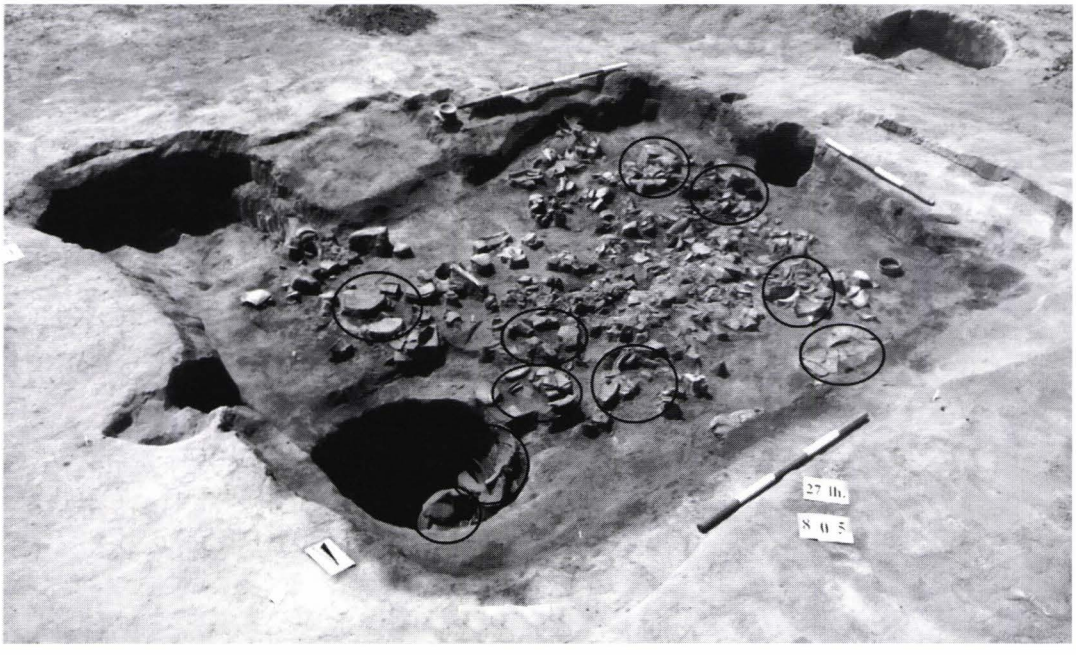

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Plate 5. 1–2. Reconstruction of the shelves (drawings: G. Beleznai);
3–4. 3D reconstruction of the workshop; 5. The layer of sherds in feature 805 (circles indicate vessels).

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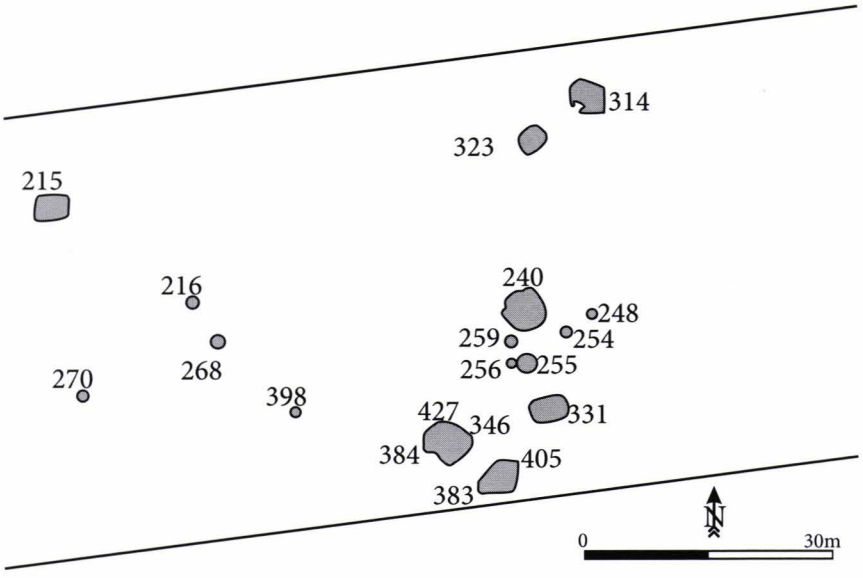

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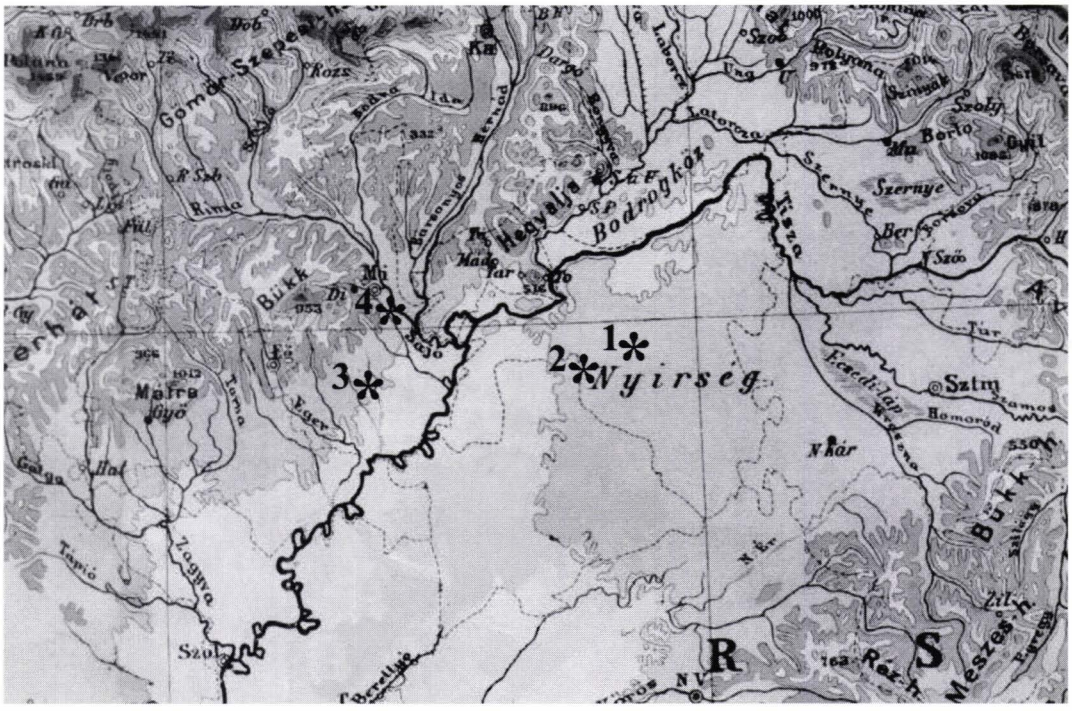

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Plate 6. 1. Late Iron Age features at Kálmánháza–*Nagy-lapos* (plan: L. Veszprémi); 2. Micro region with the Late Iron Age sites from Oros (1), Kálmánháza (2), Mezőkeresztes (3) and Sajópetri (4).

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A Central European Form of La Tène Ornament: Rings with Three and Four Large Hollow Knobs from Slovakia

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Keywords: Celtic cemeteries, Middle Danube Area, costumes, anklets

The art of the Late Iron Age, or 'Celtic art' is one of the major defining characteristics of the La Tène culture thorough out Europe, not only because of its unique style and ornaments, but also due to the various ways in which craftsmen created the artefacts. The incredible skill of the masters of the arts in the Carpathian Basin is demonstrated among the numerous ornaments and especially by a typical anklet type, specific to the Celtic cemeteries of the Middle Danube area. These are the rings with three and four large hollow knobs of exceptional quality, with a wall thickness of less than one millimetre – a technical achievement hard to accomplish even in present days when forms of casting and other techniques are more diversified (for experimental trials see: Furman 2011, 228). The present paper brings into discussion these ornaments from Slovakia, focusing on their origin, typology, production technology and the so called *Ringtracht*.

The genesis of this artefact has been traced back to the solid plain rings with massive vertical ribbing, typologically contemporaneous with knobbed rings[1] (Bujna 2005 47; Benadik 1962, 370). In Slovakia and the Czech Republic they appear in LT B2c (Bujna 2005, 149), and soon after they spread to north-western Romania. In Moravia, typical anklets of LT B2 according to Čižmář (1975, 424, fig. 5/4) occur with tubular sheet rings with vertical ribbing decorated with triple protuberances; there are also different variants of bronze knobbed anklets, Čižmář also mentions that further analysis will doubtless reveal new chronologically different variants.

Rings with hollow knobs have been defined as characteristic middle Danube ornaments of the Celts who settled in the region in the first quarter of third century BC during their historic expansion to the southeast (Kruta 2000, 416). Rings with more than ten knobs existed from LT B2a (Gebhard's Horizont 4), rings with fewer than ten knobs appeared in LT B2b (Horizont 5), while four and three knobbed rings date from LT C1 (Gebhard 1989, 76).

In the middle Danube region the earliest types are the bracelets and anklets with eleven to fifteen little hollow knobs. A marked expansion of knobbed rings occurred in the LT B2/C1 and at the beginning of LT C1, when several variants of both bracelets and anklets with eight to six hollow knobs appear.

The differences between knobbed bracelets and anklets were discussed earlier based on the comparative analysis of La Tène ornaments from south-western Slovakia, Moravia and Bohemia (Furman 2003). For south-western Slovakia, depending on the number of knobs and the presence or absence of the inner band four types of knobbed bracelets were defined, always consisting of two unequally sized parts – for example: 11+2, 7+2, 6+2, 6+1, 5+2 or 5+1 (Furman 2003, 20). On the other hand, the anklets

1 In the case of rings from Austria Siepen (2005, 53) assumes that chronologically and typologically different types similarly developed from the solid plain rings with massive vertical ribbing to rings with hollow knobs.

Iron Age Crafts and Craftsmen in the Carpathian Basin, 2014, p. 183–190

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with plain hollow knobs from south-western Slovakian graves consist of two equally sized removable parts – 6+6, 4+4, 3+3, 2+2 – (Furman 2003, 21n, 51n). For Bohemia a different evolution of knobbed rings can be observed (Furman 2003, 61). In central and north-western Bohemia the oldest knobbed rings were anklets and they had 14–18 plain hollow knobs usually consisting of two equally sized parts. The major difference between south-western Slovakia and Bohemia is given by the occurrence of rings with eight and six hollow knobs. They appear in Bohemia as anklets with two unequal parts – 6+2 and 4+2 – sized parts (Furman 2003, Tab. 3, 52).

La Tène knobbed rings in the Carpathian Basin were also divided into bracelets and anklets based on the height of knobs and the inner diameter of the rings. Accordingly, bracelets have an internal diameter of 40–55 mm and the height of the knobs is 20–30 mm, while the inner diameter of anklets is 50–80 mm and the height of the knobs exceed 30 mm (Masse–Szabó 2005, 214, fig. 3). We consider that the size of the knobs cannot be considered significant feature when determining bracelets and anklets, since rings with relatively large knobs of the earlier type were found in graves as bracelets.

Regarding the evolution of the type, the latest variants are rings with three and four large plain hollow knobs which are specific to the LT C1b-c period. These massive ornaments characterises female costume of the Carpathian Basin (Bujna 1994, 10). In inhumation graves they appear exclusively as anklets, but they are much numerous in cremation burials. In the western regions, where these objects are lacking, the development of knobbed rings ends with the variant with six hollow knobs. After their first definition as specific objects of the Carpathian Basin by Filip (1956, 136), a detailed typological examination of the findings from south-western and south-eastern Slovakia followed some fifty years later (Bujna 2005). Rings with three and four large hollow knobs were defined as a type of late bronze knobbed anklet. Based on the number of knobs two basic types were defined: BR-F5-A with four knobs rings (2+2 knobs) and BR-F5-B with three knobs (1+2 knobs). Considering the decoration between the hollow knobs further variants were defined: those with a plain surface (BR-F5-Aa) and those with a moulded surface (BR-F5-Ab). The ring from Ipeľske Predmostie cremation grave no. 3 constitutes a separate type of four knobbed rings with engraving decoration, defined in a later typology as type BR-F5-Ac (Furman 2011, 223). Analogies for engraving ornaments – a simple incised line on the margin of each knob (Fig. 1) – occur in Chotín (graves 10 and 12) and Maňa (grave 127).

Fig. 1. Chotín, grave 12b. Ring with engraved decoration.

For the territory of Hungary – Transdanubia, north-western Hungary, Tisza and Szamos region, Körös and Maros region – a number of 241 knobbed rings are known from ninety-seven sites (Masse–Szabó 2005), but only eleven have cast decoration and one has engraving ornament. Rings with three or four large hollow knobs were typologically framed also based on their surface: embossed (rings with three hollow knobs from six sites) or with smooth or moulded rib.

Based on fastening system, rings with four hollow knobs from Slovakia (Appedix 1) can be divided into two groups. The first type is the combination of two fastenings: *fermeture à broche* and *système de fermeture à goupile*, as at Dolné Trhovište grave 1/1986, Holiare grave 545, Chotín grave 10, Ipeľské Predmostie grave 3, Ižkovce graves 4, 14, 18?, 19, Palárikovo 62A/72 and Trnovec Váhom grave 398. The second type of fastening – *système de fermeture à goupile* on both ends – is represented by artefacts from Chotín grave 12, Maňa grave 14A and 127 and Palárikovo grave 62/72B? and 74. However the linking part between the knobs does not show significant differences, their fastening indicates different manufacturing methods.

The artefacts with combined fastening (*fermeture à broche* and *système de fermeture à goupile)* have single plain joints between the knobs, with strips and thin ribs (Fig. 2), while rings with *système de fermeture à goupile* (Fig. 3) on both ends have very similar conjunction to the knobbed rings from Kosd (Masse–Szabó 2005, 216, fig. 4).

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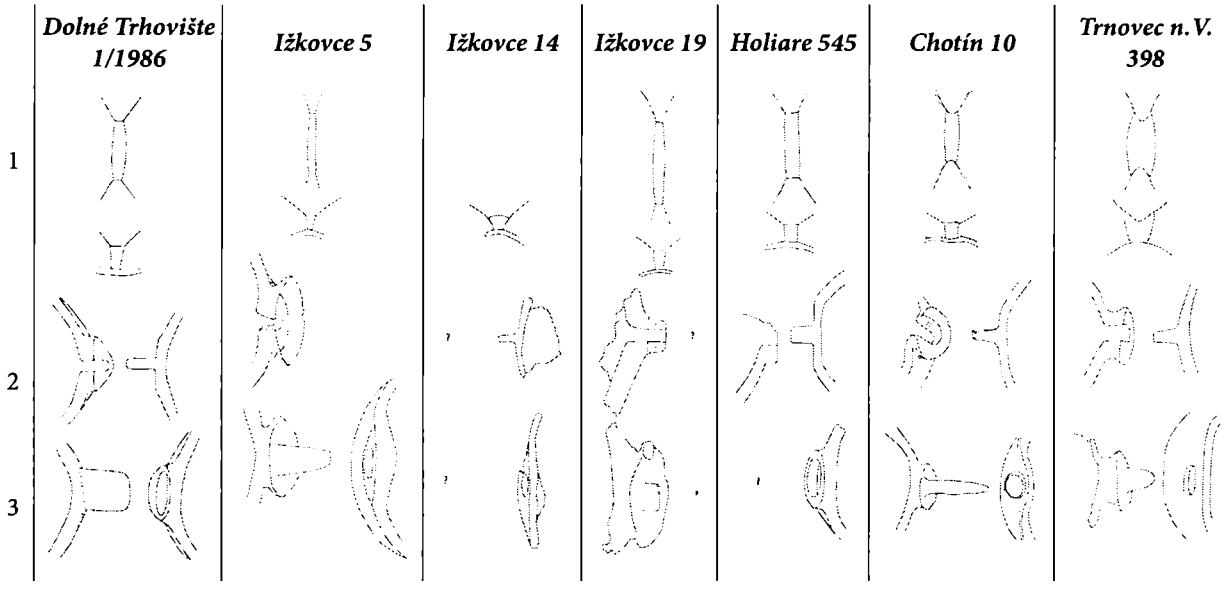

Fig. 2. 1. Types of conjunction; 2. *système de fermeture à goupile*; 3. *fermeture à broche*.

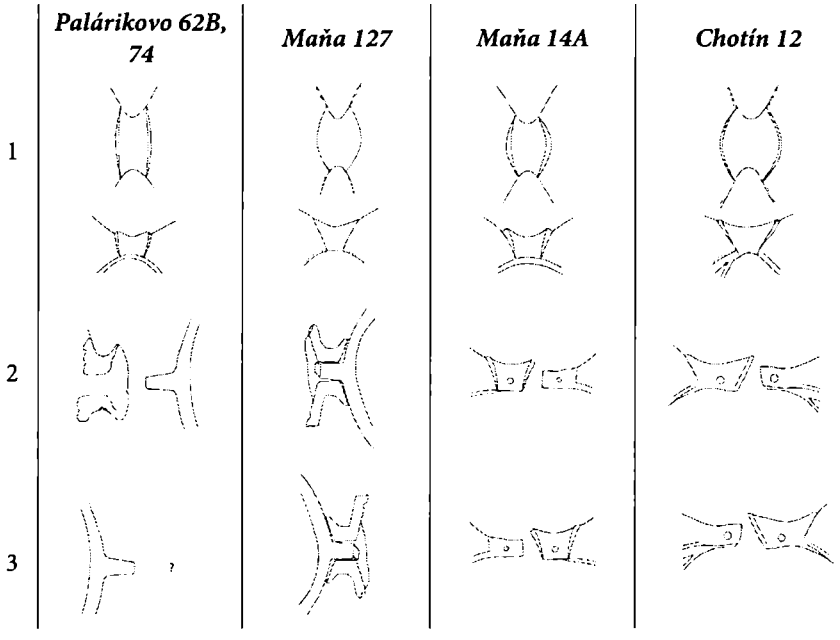

Fig. 3. 1. Types of conjunction; 2. *système de fermeture à goupile*; 3. *fermeture à goupile*.

Cast joints with embossed ornament (Masse–Szabó 2005, 216) occur only on anklets with three hollow knobs; only in the inhumation grave from Palárikovo 62A has it been recorded in the case of anklets with four hollow knobs, defined as variant BR-F5-Ab (Bujna 2005, 57, fig. 43).

Regarding the *chaîne opératoire* of these artefacts, a decade ago based on discoveries from Hungary (Masse–Szabó 2005, fig. 6) a step-by-step theoretical model has been elaborated from the casting to the final product. Three types have been distinguished: the 'snail rings' or rings with plastically decorated knobs, rings with engraved decoration and rings without ornament. All types have been made by lost-wax casting. In the case of plastically decorated knobs the embossed ornament was modelled in the mould before casting. The engraved decoration of the knobbed rings was applied after the breaking open of the investment mould. Based on experiments, the asymmetry of the rings with more than four hollow hemispheres appeared during the production of the moulds, while rings with three or four hollow knobs were more symmetrical.

Recently, based on examination of Slovakian rings with four hollow knobs from Ipeľské Predmostie but also on experiments by Rajnoch a partially different hypothesis of the system of production was

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proposed (Furman 2011, 228–230, fig. 9). These observations refer to one part of the ring, two hollow knobs from a four knobbed ring.

Obviously, even observations with the naked eye regarding the quality of the products or surface details indicate several possible technological methods. Many pieces show traces of different large flaws attributable to the quality of raw materials used for casting (Fig. 4/1). In some cases traces of repairs can be seen (Fig.4/2). Probably the hollow of knobbed rings was filled during fabrication, in some cases resulting a smooth and glossy surface, in another case like at Chotín, grave 10 (Fig. 4/3) a rough, uneven one. An interesting technological detail can be seen on the inner surface of the anklet from Dolné Trhovište, where a central rib indicates that this part was cast in two separate moulds (Fig. 4/4). In order to obtain the desired thickness (Furman 2011, 229), after casting, the surface of the finished product was filed, as it can be seen on the exterior of the ring from Dolné Trhovište (Fig. 4/5).

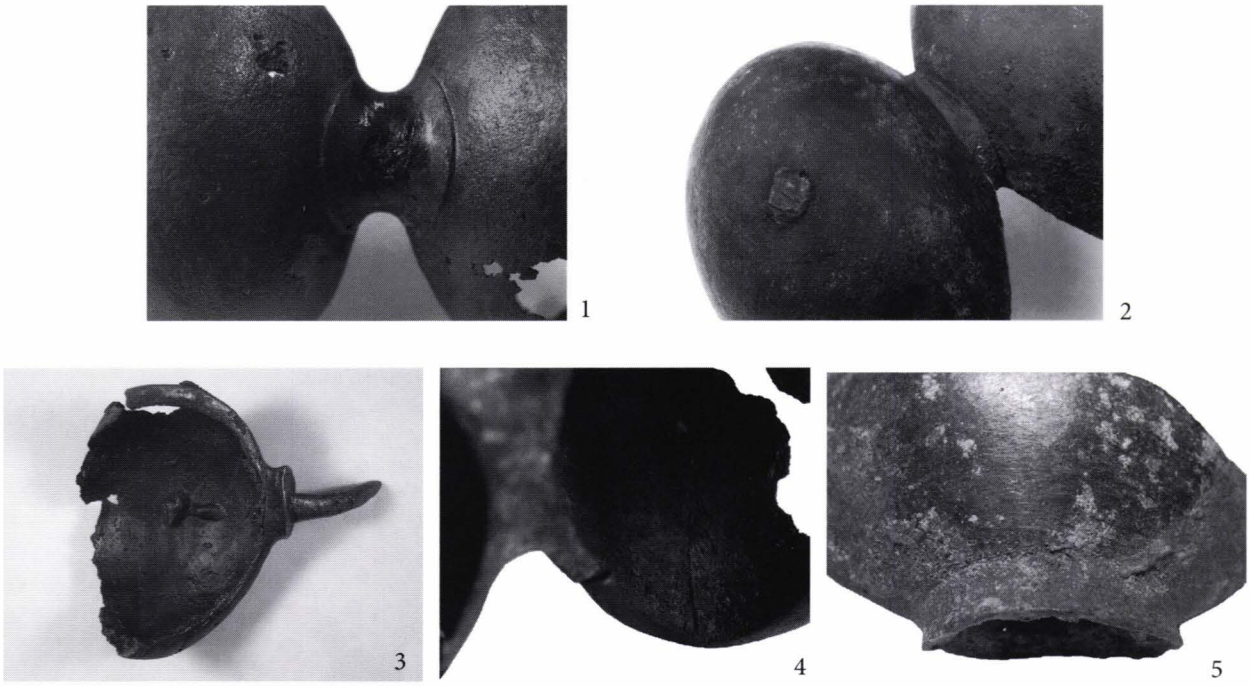

Fig. 4. 1. Maňa, grave 127; 2. Ižkovce, grave 5; 3. Chotín, grave 10; 4–5. Dolné Trhovište, grave 1/1986.

At the end of LT B2 and during LT C1 in the Middle Danube area a large number of different annular rings evolved. In this period the 'annular costume' – *costume annulaire* or *Ringtracht* – show an increasing variety, the metal rings being complemented by others made of the 'new' materials: sapropelite and glass. In this time the Middle Danube territory becomes a distinctive and determining centre for La Tène culture, with connections to the Balkans (Furman 2009, 130). A unique and genuine aspect of the annular costume of the region is given by rings with three and four large hollow knobs.

The interpretation and reconstruction of annular costume is difficult because of the predominant appearance of these inventories in cremation graves. However, several inhumation graves with four hollow knobbed rings as anklets have been unearthed in southwest Slovakia, allowing a hypothetical reconstruction of different combinations of annular costumes in the region, as well as the customs and 'fashion' in the latest phase of the La Tène culture (Fig. 5).

The inhumation graves from the Middle Danube area show an 'asymmetric model' of annular costume (Furman *forthcomming*). An exception is the unpublished grave no. 94 from Levice in whose inventory the local annular costume (Furman 2012; 2014) consists only of anklets. What may be termed the simple asymmetric model is documented in grave no. 10 and 12 from Chotín where anklets appear together with iron bracelets on the left upper arm. It should be noted, that the iron ring in grave 10 was found on the left side of the skull, but the 90 mm diameter indicates that is was worn on the upper arm. Sapropelite and glass rings appear in the annular costumes from graves no. 14A and 127 from Maňa and in graves no. 62A and 67 from Palárikovo.

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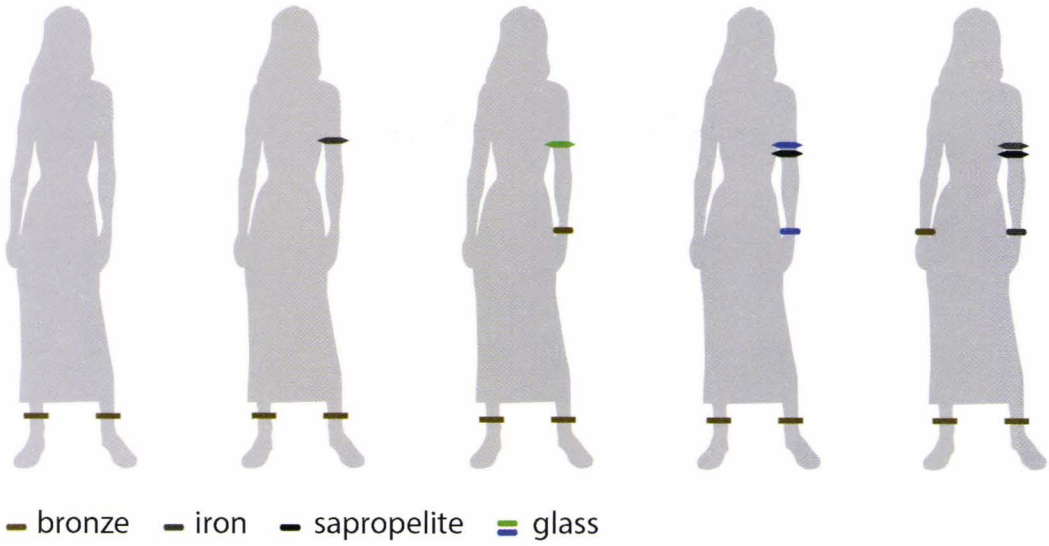

Fig. 5. Annular costumes with four hollow knobs in southwest Slovakia.

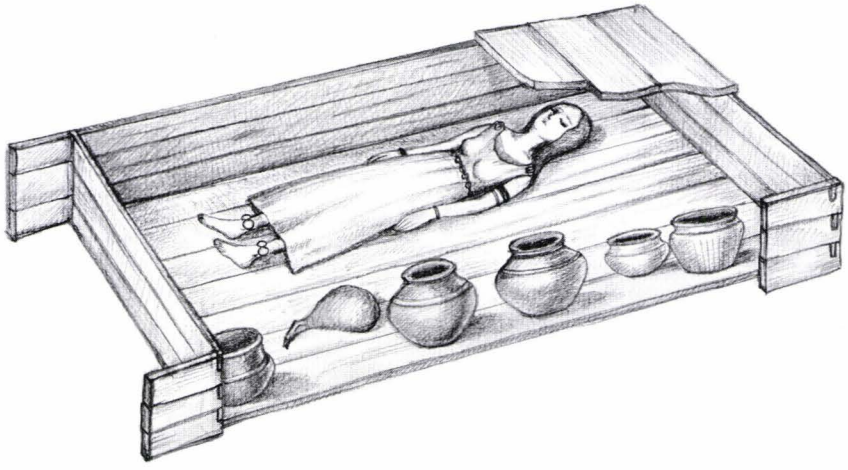

Fig. 6. Reconstruction of female grave no.14A in Maňa (drawing: E. Sologashvili).

The graves with annular costumes indicate buried members of the elite, with sumptuous costume accessories and sometimes with wood-lined grave pits (Fig. 6). Since anthropological analyses are lacking for the region, the female character of these anklets with large hollow knobs is only assumed based on the inventory of the graves and their absence from warrior burials.

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In the Carpathian Basin the production of ornaments reached an outstanding level in the LT C1 period, skilled craftsmen producing in their workshops costume accessories of exceptional quality. Anklets with three and four large hollow knobs – typical annular ornaments for the Carpathian Basin – are ornaments of high artistic value. However, their detailed technical *chaîne opératoire* is not known, certainly there is evidence for several more or less different methods of production. Based on the fastening system two types were defined, one combining two different systems (*fermeture à broche* and *système de fermeture à goupile*) and a second with a simple system (*système de fermeture à goupile*) in both places. With an overlapping geographical distribution – in the cemetery from Chotín both types are present – the two types also show differences at the conjunction of the knobs. In inhumation graves rings with three and four large hollow knobs appear only as anklets. Their combination in funeral inventories with glass and sapropelite bracelets indicate the high social status of their wearers.

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Appendix 1

Graves with rings with three and four hollow knobs from Slovakia

Cemetery, grave no.	Rite[1]	Type of rings	Fastening[2]	inner ø of ring	inner ø of knob	external ø of knob	Ornament	Observations	Reference
Dolné Trhovište no. 1/1986	I	BR-F5-Aa	ab + cd	70 × 45 mm	53–58 × 32–41 mm	63–66 × 47–57 mm	No	Diameters are not accurate because of deformation. The second part was preserved only in small fragments.	Novák 1987, 135, obr. 34/1.
Holiare no. 545	C	BR-F5-Aa	ab + cd	86 × ? mm	55–56 × 47–48 mm	67 × 62 mm	No	Only half of the ring were preserved and only small pieces from the second.	Beňadik 1957, 93, tab. 36/1, 2.
Chotín no. 10	I	BR-F5-Aa	ab + cd	Cca 80 × 50 mm	58 × 43 mm	65–67 × 56–63 mm	engraved line	Traces of riveting, not very precise work, with pores.	Ratimorská 1981, 28, tab. 9/3–4.
Chotín no. 12	I	BR-F5-Aa	ab + ab	72 × 55 mm	38 × 37 mm	53 × 45 mm	engraved line	The smallest ring with four hollow knobs.	Ratimorská 1981, 30, tab. 10A/8–9.
Ipeľské Predmostie no. 3	C	BR-F5-Ac	ab + cd	71 × 59 mm	53–58 × 35–39 mm	63–65 × 53–56 mm	Yes		Furman 2011, 222, fig. 1–5.
Ižkovce no. 5	C	BR-F5-Aa	ab + cd	69 × 60 mm	71 × 34–35 mm	82 × 53 mm	No	Superior quality.	Vizdal 1976, 154, obr. 18/1–2.
Ižkovce no. 14	C	BR-F5-Aa	ab + cd ?	?	cca 64 × 38 mm	cca 74 × 48 mm	No	Incomplete knob.	Vizdal 1976, 161, obr. 31/5.
Ižkovce no. 18	C	BR-F5-Aa ?	ab + cd ?	?	64 mm	?	?	The ring misses from the museum; data was taken from Bujna 2005, 57, Tab. 30.	Vizdal 1976, 164, obr. 35/5.
Ižkovce no. 19	C	BR-F5-Aa ?	ab + cd	?	cca 70 × 40 mm	cca 90 × 60 mm	No	Incomplete knob. The ring might be both with three or four hollow knobs.	Vizdal 1976, 164.
Ižkovce no. 28	C	BR-F5-B	?	?	?	77–102	?	The ring misses from the museum; data was taken from Bujna 2005, 57, Tab. 30.	Vizdal 1983, 488, Tab. 1/4.
Maňa no. 127	I	BR-F5-Aa	ab + ab	80 × 60 mm	48 × 43 mm	62 × 56 mm	engraved line	Incompletely preserved ring, not very precise work, with pores.	Benadik 1983, 59, Taf. 50/19–20.
Maňa no. 14A	I	BR-F5-Aa	ab + ab	76 × 57 mm	53–57 × 34–39 mm	64–66 × 49–53 mm	No	Traces of fabrication marks.	Benadik 1983, 18, Taf. 8/3–4.
Palárikovo no. 62A/72	I	BR-F5-Ab	ab + cd	70 mm	55 mm		No	The ring misses from the Institute; data was taken from Bujna 2005, 57, Tab. 30.	Bujna 2005, 57, Tab. 30.

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Palárikovo no. 62B/72	C	BR-F5-Aa	ab + ab?	Cca 60 mm	52 × cca 40 mm	63 × cca 50 mm	No	Preserved only in small fragments.	No. of AR 7379/75
Palárikovo no. 67/72	I[3]	BR-F5-B	?	65–74 mm		75–79 mm	No	The ring misses from the Institute; data was taken from Bujna 2005, 57, Tab. 30.	Bujna 2005, 57, Tab. 30. No. of AR 7379/75
Palárikovo no. 74/72	I	BR-F5-Aa	ab + ab	?	52 × 36 mm	62 × 51 mm	No	According to J. Bujna (2005, Tab. 29), there are six hollow knobs: BR-F4. Its dimensions and type indicate BR-F5.	No. of AR 7379/75
Trnovec nad Váhom no. 398	C	BR-F5-Aa	ab + cd	Cca 60 mm	48 × 35 mm	60 × 47 mm	No	Only one hollow knob was preserved with small pieces from the rest.	Beňadik 1957, 30, Tab. 8/7–11.
Levice no. 94	I	?	?	?	?	?	?	The inventory consists only of four knobbed anklets.	Unpublished grave. Information: RNDr. M. Samuel.

[1] I = inhumation; C = cremation.

[2] ab = *système de fermeture à goupile*; cd = *fermeture à broche* (see: Furman 2011, fig. 2, 223).

[3] In this grave both the human bones and garment accessories were in secondary position.

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List of figures

Fig. 1. Chotín, grave 12b. Ring with engraved decoration.
Fig. 2. 1. Types of conjunction; 2. *système de fermeture à goupile*; 3. *fermeture à broche.*
Fig. 3. 1. Types of conjunction; 2. *système de fermeture à goupile*; 3. *fermeture à goupile.*
Fig. 4. 1. Maňa, grave 127; 2. Ižkovce, grave 5; 3. Chotín, grave 10; 4–5. Dolné Trhovište, grave 1/1986.
Fig. 5. Annular costumes with four hollow knobs in southwest Slovakia.
Fig. 6. Reconstruction of female grave no.14A in Maňa (drawing: E. Sologashvili).

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La Tène Bone and Antler Artefacts from Nitra*

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Keywords: La Tène Period, Slovakia, settlement, bone and antler artefacts

Bone, horn and antler, besides wood and stone are important materials which fit well with other raw materials used for the production of various objects of daily use in every historical period. Several techniques and production principles have persisted throughout prehistory into modern times. It may be said that there is a direct relation between use and material. According to a number of findings this raw material dominated during the Early and Middle Bronze Ages, particularly in the Maďarovce and Otomani Cultures (Furmánek *et al.* 1991, 133–239). Study on this subject was elaborated by A. Točík (1959), whereby the artefacts were not only divided functionally, but also provided with Mediterranean analogies. Further significant occurrence of bone artefacts (cheeks, etc.) is recorded in Hallstatt period (Paulík 1955, 447–449). In the La Tène settlements the bone and antler industry belongs to relatively rare finds and it is completely absent in La Tène grave goods (Březinová 1995, 12). In later periods it remains in use, but the occurrence is waning. There is a slight resurgence of production is in the Roman and Migration periods (Kaván 1980; Hrnčiarik 2012, with further literature).

Knowledge of the anatomical qualities well as the technological properties of animal and bird bones, horns and antlers, is always required in the study of raw material. It is particularly the hardness, elasticity and fissile nature of raw materials which is to the fore. Cutting of bone and antler can have been done with a chisel, a saw, an axe or a knife. In applying decoration various drills and simple forks as compasses or gravers were used. Prior to the treatment the simplest procedures were applied to soften the material. Three basic steps are considered: 1. Soaking in cold water; 2. warm soaking in hot water; 3. soaking in water and lye. Experiments have confirmed that the antler is softened by boiling in water. After 30 minutes the antler is easy to handle and cut with a knife. From such a prepared material various chippings were cut serving as an intermediate stage for further processing. Considerable waste is produced when working with this raw material. This easily available material, though quite difficult to handle in fact was another suitable material for production of objects of daily use – various instruments, tools and ornaments. It is one of the industries in which can be assumed not only as home-craft, but also specialized production. Use of this material was mainly extended to cattle bones and knowledge of each type of bone and their qualities.

Bone artefacts come from three Iron Age non-fortified agricultural settlements in the area of Nitra, laying 2–4 km one from the other, *Šindolka*, *Chrenová II* and *Mikov dvor* (Fig. 1). They are part of a more or less contemporary settlement agglomeration dated to LT C1–D (Březinová 1999; 2009). 98 features of different nature were excavated predominant are the pit houses. Objects coming from the bone and antler industry were found in 17 of them, totalling 20 pieces.

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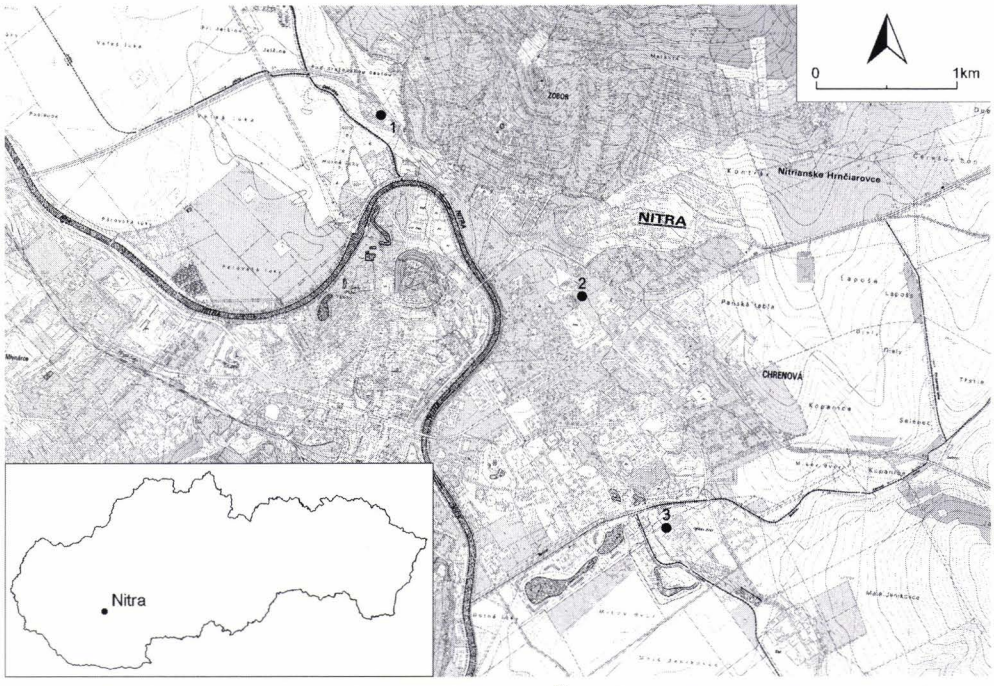

Fig. 1. La Tène settlements in the area of Nitra. 1. *Šindolka*; 2. *Chrenová II*; 3. *Mikov dvor*.

The settlements are located at the interface of uplands and lowlands, near the watercourse and settlement at *Šindolka* which is situated near the source of drinking water. There are plenty of soils suitable for growing agricultural products and domestic animal breeding. The surrounding forests are a source of other raw materials, as well as game animals. Based on the archaeozoological analysis at Nitra–*Šindolka* (Fabiš 2000) it has been proved that the inhabitants used domestic animals both for implement production and for consumption. The analysed sample of animal bones represents 44,441 g, comprising 1,579 pieces. Bones of domestic animals represents 96.5%. These consist mainly of cattle (40.8%), whose breeding was related to the production of milk, meat, leather making, the supplying of raw materials (bone and antler) and, certainly as a form of traction. For similar reasons sheep and goats were bred (16.4%). Domestic pig comprised 21.1%. From draft animals horse is also represented (2.2%) and donkey (0.3%) while 5.4% could not be separated between horse and donkey. Dog was represented by 3.3% identified while only in one case was a single bone identified as poultry (0.1%). The comparison of the occurrence of animal bones in cemeteries in Slovakia (Ambros 1984) shows that domestic poultry and beef do not belong to the usual meat offerings; it can be considered rather as something extraordinary and classified as a sign of social status. An identical situation as in Šindolka is to be found also at another large settlement in Bořitov (Čižmář 2003) with the most represented species being cattle (31%), pig (28.9%), goat-sheep (27.4%); horse (8.4%), dog (2.7%) and chicken representing 0.3%. Only 1.5% of wild animals is represented in osteological material; these are a hare, wolf, wild boar, stag and roe deer. Similarly, in Radověsice game animals represent 1.5% of the total amount (Waldhauser 1993, 323).

In summary, in the investigated assemblage artefacts were only made of bone or antler. Products made of horn are absent. Generally they are divided into artefacts that were functional and served as tools or were part of a tool-kit, and artefacts of decorative nature, such as pendants, pins and other artefacts which were intended for entertainment such as dice.

The most commonly represented artefacts that were functional and served as tools or were part of a tool are awls, needles and pins (Pl. 1/1, 3, 12, 13, 15, 18, 19), chisels and handles (Pl. 1/4, 6, 8, 11, 14, 20). These are artefacts that could be used in leather processing, textile production, or in other forms of domestic use. The same interpretation was observed for example in Radověsice (Waldhauser 1993, 207–211) and in Moravian settlements (Meduna 1980, 127–128). Frequently it is only as a part of another tool – a handle, a socket (Pl. 1/2, 9, 13, 14, 20). Bone and antler tools are also often used in decoration and treatment of pottery (combing, stamping), but such artefacts were not discovered in these sites and they are rare finds in Slovakia. Artefacts for ring stamping are known from settlement at Šaľa-Veča

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(Březinová 1996) and a bone artefact for pottery surface treatment is from Bratislava-Devín (Pieta–Zachar 1993, fig. 114/11; Pieta 2002). Perhaps used in pottery surface treatment was also a bone artefact with teeth from Nitriansky Hrádok–*Zámeček* (Březinová 2009). In Moravia, a unique artefact of bone stamp in the shape of concentric circles was found at settlement in Tvarožné dated from LT B to LT D1. An artefact with a double leaf ornament was found in Polešovice (Meduna 1980; Vlasatíková 2002). Tools for pottery surface treatment are known from Manching (Kappel 1969, 209, Abb. 1/2; Jacobi 1974, 56). Another one is mentioned from metallurgical workshop in Pavlov, and identical shapes were found also in Budapest (Bónis 1969, 194; see also Megaw–Megaw 2006).

In the category of artefacts of decorative nature (pendants, pins and artefacts intended for gaming) only two – or at a maximum three – artefacts may be included. A pendant from Nitra–*Šindolka*, feature 5/68, No. 151 (Pl. 1/10) is made of a curved plate of cervical vertebra with a pierced hole for hanging. It is from a cattle bone of an individual less than 7–8 years old (Fabiš 1999).

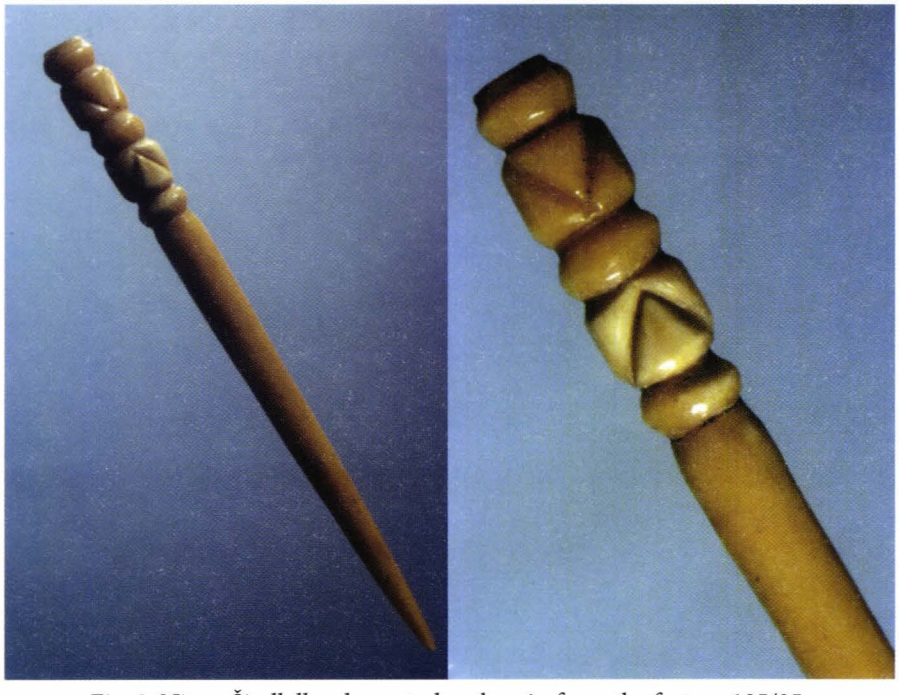

Fig. 2. Nitra–*Šindlolka*, decorated antler pin from the feature 185/85.

Despite the fact that needles were included with functional artefacts in the first group, a needle from Nitra–*Šindolka*, feature 185/85, No. 48 (Pl. 1/3; Fig. 2) is so extraordinary that deserves inclusion among art artefacts. It is most likely made of a deer antler (Fabiš 1999). The upper end is sawn and broken off. Head (top) of the pin has a height of 3.1 mm. It is divided plastically into 5 parts. Two cylindrical plates with height of 8 mm are separated by three disks with height of 5 mm. Decoration on cylindrical parts is impressed, cut, creating inclined lines converging into the shape of letter V. The total length is 110 mm. The material is smoothed. It is a very precisely made object with considerable artistic values. A decorated head of a pin is documented at the settlement Michelstetten (Trebsche 2010, Taf. 63/1), with the incised letter X. Similar decoration can also probably be found on the fragment of a pin from Bratislava (Pieta–Zachar 1993, fig. 100/6).

It is difficult to determine the function of a bone artefact from Nitra–*Šindolka*, feature 164/85, No. 18 (Pl. 1/2). Perhaps, it was an unfinished artefact, maybe a cast off. The fragment of the diaphysis of a long bone of deer/cattle (Fabiš 1999) has been halved and it has been modified into a squared cross-section. Hypothetically, it may be considered as a half-finished product for a dice, as are known from Slovenský Grob, feature 1/08 (Čambal 2011, tab. II/13a–b). The main occurrence of dice and counters is connected primarily with the oppidum phase of the Late La Tène Period in Western Europe (Krüger 1982, 136). Italy is considered as the influence north of the Alps for such gaming pieces (Maier 1961, 355). But rectangular-shaped dice also occur sporadically in LT C (Krüger 1982, 166). Similar in shape and dimensions are finds of unfinished products from Manching (Maier 1961, 354, Abb. 1/3, 4). They

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were found also in settlements within the Middle Danube area. Moreover they come from open lowland settlements in Slovakia. Perhaps the oldest proof is represented by two dice from Sereď–*Mačanské vŕšky* (Paulík 1957, fig. 3238/2, 10), which are dated based on fibulae and a sapropelite bracelet to LT C. A dice comes from the backfill of the feature 1/73 at Kúty–*Čapengát* (Zachar 1976, fig. 14/5; 15/4). Younger and much richer evidences of bone dice are from the time of the oppida in western and central Europe. In Slovakia they are known from Bratislava–*Panská ulica č. 19–21* and the western foreland of the Bratislava castle (Pieta–Zachar 1993, 175, fig. 100/5; Bazovský 2012, 50), in Bohemia from Staré Hradisko and Drnholec (Čižmář–Jelínková 1985). Perhaps the greatest number of dice and playing stones comes from Stradonice (Píč 1903, tab. XLIV).

A separate category is the unfinished objects, faulty pieces and wastes. These artefacts were never in use, but have some traces of treatment, that is, human intervention (Pl. 1/5, 7, 8, 16, 17).The pearl white deer antler object with variously directed traces of cutting from Nitra–*Šindolka*, feature 150/77 can be considered as a faulty piece (Pl. 1/7), or possibly it was an attempt to produce a functional artefact. It might have been a test piece without specific intent to produce a functional artefact.

Interesting finds are represented by bird bones with no specific function from *Šindolka*, feature 165/85. The bone was cut incorrectly and broken off at both ends. According the analysis it is the diaphysis of a large bird, probably a swan (Fabiš 1999). An unfinished product comes from Nitra–*Chrenová*, feature 25/77 (total length: 160 mm, diameter of a hole: 19 mm). It is a treated antler, on the one side finished with hollow cylindrical pipe formed by removing – hollowing out the inside part – spongiosis (Pl. 1/17).

In addition to finds made of animal bones and antlers small disks with holes cut from human skulls are represented if rarely. This kind of find is not known from the region of Nitra so far. In Slovakia, however, it is represented at several sites as noted in a recent paper (Čurný *et al.* 2006).

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From bone and antler several functional and decorative artefacts were produced in the area of Nitra. Despite the availability of raw materials they were preserved in very few examples within the settlements. Modified antler parts were often used as handles of various tools, such as rasps, knives, chisel, awls and more. The most common artefacts are various bone and antler needles, which could have been used for sewing or, depending on size, weaving and as awls. To the standard equipment, the hair pins are included, whose heads are sometimes highlighted with carved ornament. There are also animal shoulder blades that could have served as potter's equipment for surface smoothing. Some of them have teeth and served in pottery surface treatment and stamping. Scrapers of different size are common. They are associated functionally with the leather processing. In the settlement finds dice can be found, mostly rectangle-shaped with the numbering on four sides. Sizes are quite diverse. Bone and antler is basically easy available but challenging material to treat. It was another suitable material for the production of the object of daily use – various tools and ornaments. It is one of the industries in which can be assumed not only domestic, but also specialized production. The analysis of the finds shows that some of them are products of inexperienced crafts-people (Pl. 1/7), as well as first-class goods that can be classified as art and craft product (Pl. 1/3, Fig. 2).

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List of figures

Fig. 1. La Tène settlements in the area of Nitra. 1. *Šindolka*; 2. *Chrenová II*; 3. *Mikov dvor*.
Fig. 2. Nitra–*Šindlolka*, decorated antler pin from the feature 185/85.

List of plates

Pl. 1. Bone and antler objects. 1–11. Nitra–*Šindolka*; 12–17. Nitra–*Chrenvá II*; 18–20. Nitra–*Mikov dvor*.

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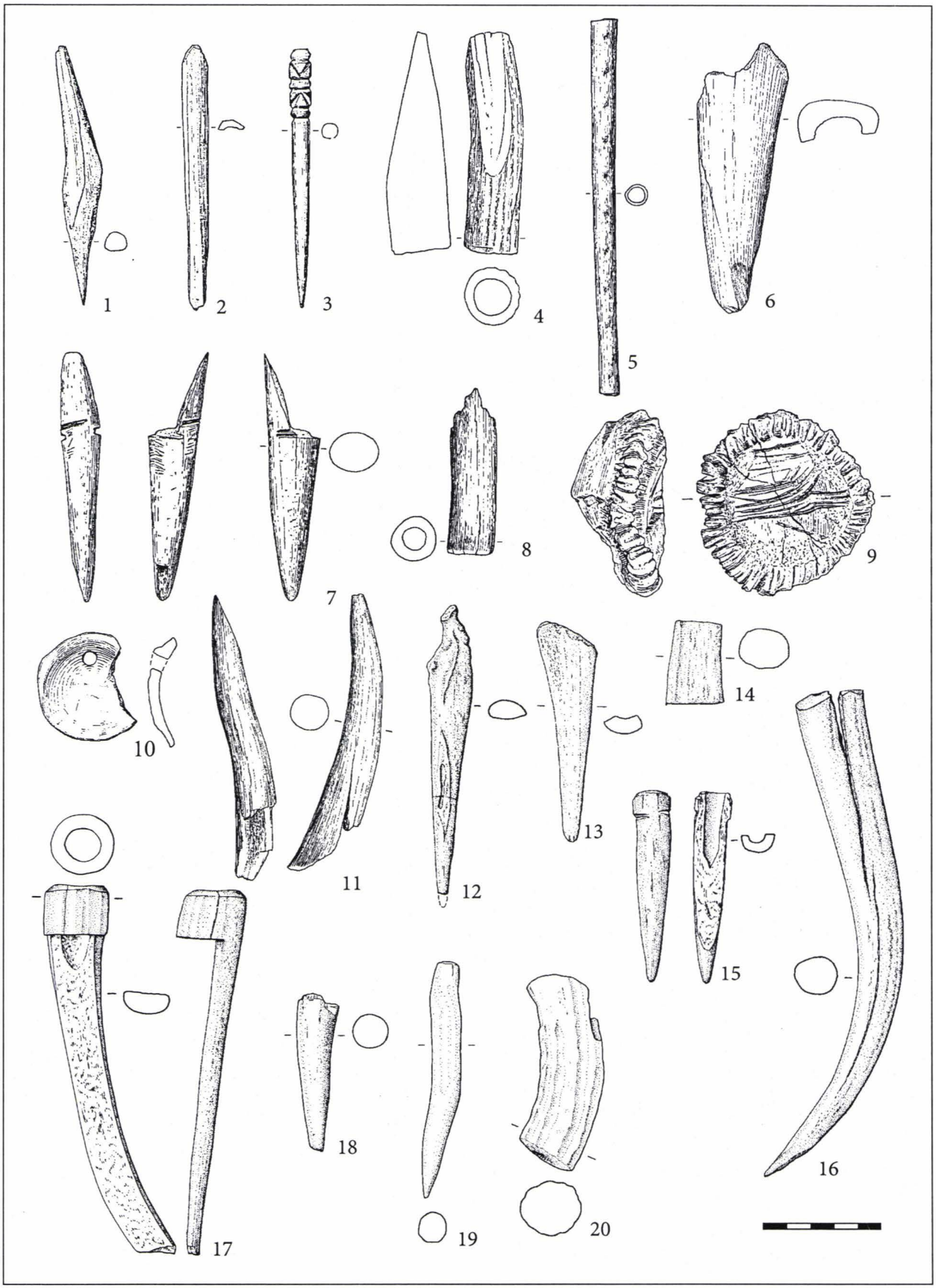

Plate 1. Bone and antler objects.
1–11. Nitra–*Šindolka*; 12–17. Nitra–*Chrenvá II*; 18–20. Nitra–*Mikov dvor.*

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Pottery Production during the Late Iron Age in North-Western Romania

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Keywords: La Tène culture, Celtic hand-made pottery, wheel-thrown, pottery kiln, potter's wheel

In the opinion of V. Gordon Childe: "production of ceramics is man's first conscious use of a chemical transformation" (Băcueț-Crișan 2007, 114). Knowing clay begins with extracting good quality loam, transporting it to the workshop where it is cleaned of impurities (gravel, roots fragments, etc.), then mixing it with water and kneading it until a pasty consistency is reached. Vessels made of too dense or too fine clay tends to crack in general when dried or to explode during firing which is why tempering materials are added. The tempering materials – sand, granulated lime, gravel, mica, crushed potsherds, graphite, organic materials, chopped straw or chaff, etc. – allow water crystalloids to escape from the vessel's body when dried or fired.

The vessel is moulded from a ball of clay with the hands or on the potter's wheel. After moulding, the finishing follows, by edging the surfaces and burnishing. The concern for beauty of form is accomplished by the decoration applied on the exterior surfaces and sometimes – in the case of bowls and dishes – on the inner surface. The decoration is done by incision, excision, folding, filleting, imprinting, plastic ornament, painting and incrustation. The range of embossed plastic ornaments are various: bean shapes, belts or braids, textile impressions, and anthropomorphic or zoomorphic protomes. Especially during the Copper, Bronze and Iron Ages, stamped decorations are widely used. In the Neolithic and Bronze Age the most common was the use of barbotine, consisting in the application of slip to the pottery surfaces by submerging them in liquid clay and further pouring or splashing with slip to even out the surface.

The most numerous and diversified discoveries during the La Tène period were those of pottery. This category is to be found in large amount both in cemeteries and settlements. By the manner of manufacturing, pottery is divided into two major groups: hand-made and wheel-thrown. Both categories of from the north-western Transylvania are already known in the immediately previous La Tène period. Hand-made pottery and that worked by the potter's wheel from the late Hallstatt period (Ha D2), respectively datable from the fifth century and the first half of the fourth century BC, is relatively well-known today due to research carried out in recent decades in north-western Transylvania (Németi 1982; 1988; 2010; 2011; 2013; Tankó 2010; Szabó–Tankó 2007; Szabó 2007).

Coil building as a method of forming pottery (Pl. 1/1) is a widespread method with less known about vessels manufactured from small flat discs of clay linked together (Kreiter 2008, 134–145, fig. 7). In both cases for shaping the rim and smoothing the walls the slow wheel was used (the wheel being rotated by hand), in fact a disk moved by the potter's hand or helped by another person. In the La Tène period the wheel is modified so that the wheel becomes heavy and large enough to allow a prolonged rotation – relative pivoted support.

The potter's wheel is mentioned in Mesopotamia, in Ur around 3500 BC then it became known in Egypt in 2800 BC undergoing a long evolution towards the fast wheel, also called *Spindelscheiben*

Iron Age Crafts and Craftsmen in the Carpathian Basin, 2014, p. 199–208

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(Pl. 1/2). The primitive hand wheel or *Blockscheiben*, has a variant with a more rapid spin (*Kreuzscheiben*), evolving towards the rapid wheel with a fixed axle so that the upper wheel is put in motion by the wheel below actuated with the potter's foot, allowing the craftsman to use both hands in shaping the pot.

The medium wheel becomes known in the northern part of the Black Sea, in the Greek colonies around 600 BC during the same period appearing in southern France (Massalia), whilst in the Celtic environment north from the Alps it only appears around 400 BC. Shaping of pots by the Greeks judging by representations on black- and red-figure vessels shows the use of rapid or medium spin wheel actuated by hand or by using a slave to do it, ensuring a more rapid and longer spin.[1] Thus the potters have their both hands free (Pl. 1/4–7) to use them in a more symmetrical, precise and quick mould (Kresz 1991, 524–591).

The firing of pots or of other artefacts made of clay is perhaps the most complex activity in pottery. A well-fired ware has a low porosity being better to use in cooking, storing or for general usage. Transformation of clay in ceramics is done, in general, at a temperature of approx. 550–600°C. Firing takes place in oxidant or reducing environment. Oxidant firing in the presence of significant quantities of oxygen confers, in general, a red colour with certain shades depending on the intensity of firing and the type of clay used. Pottery with a scarlet or red core shows that the firing temperature was quite high and if it is grey or black it shows that the temperature was lower. During the reductive firing (damped firing) lots of carbon monoxide is produced which penetrate the vessels' walls generating the black colour in differing shades from grey to dark black.

In free or opened firing the pottery is placed directly on the ground or on a bed of fuel, covered by several further layers of fuel. This type of firing has its drawbacks: the temperature during firing is quite low, the core of the vessels is completely black, the degree of porosity is high, the temperature cannot be controlled and some pots crack due to direct contact with the fire. Potters from the Neolithic and Bronze Age usually fired vessels in pits, this being in fact the first firing installation where the pots were arranged in the centre of the hole on a stone or fuel bed with the fuel being arranged around and over the pots (Pl. 1/8). Using different quality fuels, burning slowly (as with various types of wood, twigs, leaves, dried hay, manure, etc.) to which was added a small amount of dried wood. The firing takes two to three hours, the temperature rising up to 700°C, thus obtaining an oxidant firing or even a reductive firing, the temperature being more easily controlled, the pots are better fired and fewer rejects produced. It cannot be denied that by firing in pits well-fired vessels cannot be obtained, although in some cases even nice and elegant forms can be produced if we think of the vessels discovered in tells or in cemeteries from the Bronze Age (Otomani/Vărşand culture, Füzesabony culture, Suciu de Sus, Wietenberg and the exceptional artefacts from the Lăpuş group). A high quality firing cannot be obtained except in a confined firing place, by controlling the temperature inside the kiln and obtaining a level of firing temperature as high as 800–900°C. In Ancient Egypt, they used to make surface level kilns for firing ceramics (Pl 1/3). Ancient Greek potters used kilns like those illustrated on the Greek black- and red figure pots (Pl 1/9). It seems that such a true kiln in the Carpathian Basin is the innovation of Celts after penetrating and colonizing this region at the end of the fourth century BC, or around the year 310 BC (late LT B1).

The Celtic pottery kiln is almost entirely underground, vertical with two compartments: the firing chamber is divided by a plastered flue plate. When building such a kiln firstly the size and location of the kiln is established, then the firing chamber is dug out so that the arch of the kiln will be higher than ground level, a part of the arch may be made of woven wattle, covered in clay inside and out. At a certain depth, the firing chamber was dug leaving a middle wall made of clay with a crossbeam to hold the flue plate. Then at an established distance the pit for stoking the kiln was dug up to the level of the firing chamber floor. By digging out the distance between the kiln and the firing chamber, leaving again a middle wall, two fire holes are obtain as a rule. Seldom there is just one fire hole sometimes combining the two procedures; a larger hole is scooped at the margin of the supply pit, then leaving a middle wall between them. The entire surface is thickly covered with yellow limey clay. The flue plate was built by being put on a middle wall and a circular crossbeam made of twigs on which was placed sedge, reed mace and bulrush on which was added in varied thickness clay mixed with straw or crushed stone. Thus

1 Information: Katalin Sidó.

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a clay platter is formed, in which some thicker branches used to be fixed usually vertically perforating the platter in two or three circular layers. When the potter considered the installation finished, he would fill up the firing hole and chamber with wood making a high-temperature fire for warming up the inside of the kiln and by burning the branches inside the flue plate holes were obtained in a circular disposition, in two or three rows. In general, in front of the firing holes there is a layer of clay burnt clearly demonstrating that the fire has burnt in front of the fire holes and that the hot air and smoke is being forced from the firing chamber by a strong draft into the holes from the flue plate inside the firing chamber of the kiln. In this set-up the pots from the firing chamber are protected from direct contact with fire so the firing is more uniform and the spoilt pots are fewer (Pl. 2/1–4).

The pottery kiln is supplied from a hole dug out lower than the fire holes and in general the entire complex was an ensemble functioning as a workshop. From a single supply hole two or more kilns were commissioned, probably not functioning at the same time, as was the case of complex no. 10 from Carei–*Ferma avicolă*, where three kilns were investigated (Németi 2013) or complex 02.A.93 from Sajópetri–*Hosszú-dűlő*, also with three kilns (Szabó 2007, 343). The site at Esztergom–*Kossuth street* no. 14–18 can also be mentioned, where from a single lit two kilns were stoked (Kelemen 1999, 90) as well as in Ordacsehi–*Csereföld* (Honti *et al.* 2002, 3–36) or Gór–*Kápolnadomb* (Ilon 1998, 85, fig. 2). In north-western Romania at Biharia three kilns were supplied by one pit, while at Agireş–*Sub Păşune* two kilns were. Depending on orientation the data differs but, in general, kiln orientation depends on the local wind direction.. The size of kilns varies from one meter in diameter up to 1.8–2 m. For example, the kilns discovered at Carei–*By-pass road*, complex 31/1 had the diameter of 0.95 m and complex no. 100 1.4 m. At Aghireş–*Sub Păşune* complex 53 was 1.33 m in diameter and complex 53/1 excavated in 2008 had a diameter of 1.20 m. At Sajópetri–*Hosszú-dűlő* kiln no. 36 was of 1.30 m; at Mezőkeresztes–*Cethalom* the kiln in complex 15/A had a diameter of 1.20 m, and complex 15 had a diameter of 0.90 m (Wolf–Somogyi 1997). At Békásmegyer and Budapest–*Gellérthegy-Tabán* the majority of kilns had a diameter of 1.20 m up to 2 m (Nagy 1942, 166; Bónis 1969, 36).

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The first mention of a Celtic pottery kiln in the Carpathian Basin was made at the end of the nineteenth century during the excavations at Hatvan–Boldog (Pósta 1895, fig. 4). The discoverer has given a detailed description of the site but alas was not able to determine its function and dating. The feature discovered at Békásmegyer in 1942 was well described (Nagy 1942, 162–172, fig. 3/9–10; 4/4–18) and so were the kilns discovered at Ózd–*Stadion* (Korek 1958, fig. 1). In Hungarian territory, up to 2006 from 30 sites 57 pottery kilns have been recorded mentioned,[2] and based on more recent information from an additional 40 sites another 70 kilns are now known (Szöllősi 2008, 327). Their number will increase in the future due to an increasing number of archaeological discoveries.

The first pottery kilns from north-western Transylvania were discovered at the cattle farm at Andrid (Németi 1974, 579–584) (Pl. 2/5) and at Biharia (Dumitraşcu 1982; 1994, 79–80, fig 45; 48/1–2; 49–50; Dumitraşcu 2011, 182) (Pl. 2/6). More recently, identical kilns were discovered at Căuceu, Bihor County[3] (Pl. 3/1), Aghireş–*Sub Pădure* (Băcueţ *et al.* 2009, 31–33, pl. 95–97) (Pl. 3/2), at Carei–*By-pass road* (Pl. 3/3) and Carei–*Ferma avicolă* (Pl. 3/4). From north-west Transylvania from six localities only 13 pottery kilns are known (Fig. 1).

There are a few La Tène settlements where more than one pottery kiln have been found at Gomolava 16, at Budapest–*Kende street* 7 (Szöllősi 2008, 335), at Sajópetri–*Hosszú-dűlő* 8 (Czajlik–Tankó 2007, 220–225), at Budapest–*Gellérthegy-Tabán* 6, at Esztergom–*Kossuth street* 5,and at Sopron–*Krautacher* 5 (Jerem 1984). The question is: may these sites be considered pottery production centres? We do not have an answer but we may certainly state that each La Tène archaeological site used to produce ceramics not only for their community but also high quality pottery, which was probably acquired by a larger centre or used in religious ceremonies, rituals or burials. There may be perhaps larger centres of production without as yet sufficient archaeological proof to support this view.

2 http://sirasok.blog.hu/2008/10/07/a_keltak_kemencei, visited on 14 August 2014.

3 For information regarding this discovery we would like to thank A. Lakatos.

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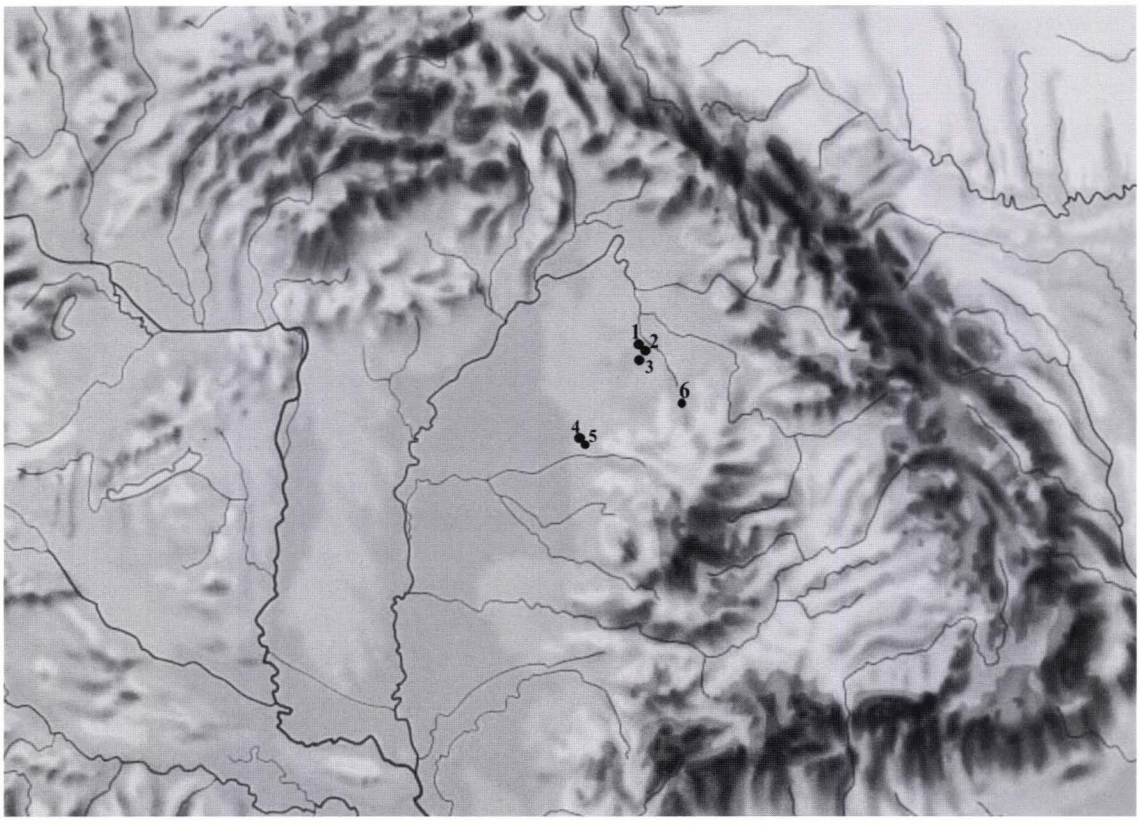

Fig. 1. Celtic pottery kilns in north-western Romania. 1. Carei; 2. Carei; 3. Andrid; 4. Biharea; 5. Căuceu; 6. Aghireș.

This type of pottery kiln was so practical that in Pannonia, especially in the areas inhabited by the Eravisci, the Romans took it over and distributed it along the *Barbaricum* in the Sarmatian and free Dacian environments, as proven by the discoveries from Lazuri–*Râtul lui Béla* (Bader–Lazin 1980, 76, fig. 46; Gindele 2010, 62. fig. 30; Lazin 2011, 177–180) or Medieșul Aurit–*Șuculeu* (Dumitrașcu–Bader 1967, fig. 5–10; Gindele 2012, 42).

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List of figures

Fig. 1. Celtic pottery kilns in north-western Romania. 1. Carei; 2. Carei; 3. Andrid; 4. Biharea; 5. Căuceu; 6. Aghireș.

List of plates

Pl. 1. 1. Reconstruction of use of kiln and potting (drawing: M. Lakó); 2. Evolution of the potter's wheel (after Kresz 1991); 3. Ancient Egyptian pottery making (after Biczó–Kulcsár 1987); 4–7. Ancient Greek potter's wheel; 8. Reconstruction of Neolithic pottery kilns (after Biczó–Kulcsár 1987); 9. Ancient Greek pottery kiln.

Pl. 2. 1–4. Part of a Celtic pottery kiln: 1. Stoke holes and firing chambers; 2. Raised floor of the kiln; 3. Two chambered firing place; 4. Pottery kiln in drawing; 5. Pottery kiln from Andrid–*CAP*; 6. Pottery kiln from Biharea (after Dumitrașcu 1982).

Pl. 3. Pottery kilns. 1. Căuceu, Bihor County; 2. Aghireș–*Sub pădure*, Sălaj County; 3. Carei–*By-pass road* CX. 100, Satu Mare County; 4. Carei–*Ferma Avicolă* CX. 10, Satu Mare County.

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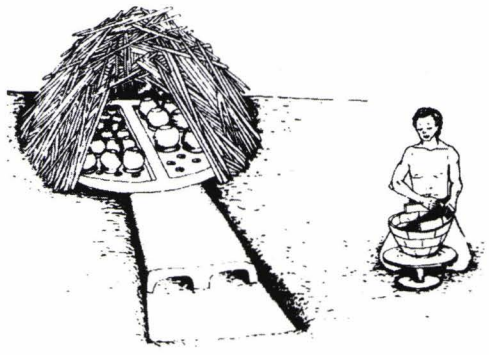
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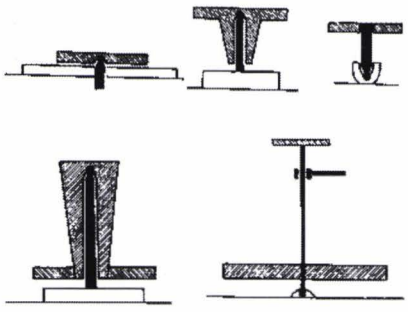
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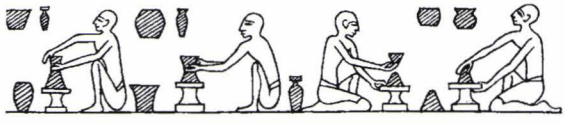

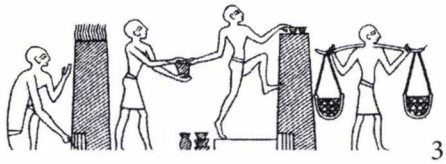
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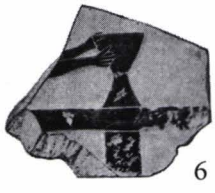
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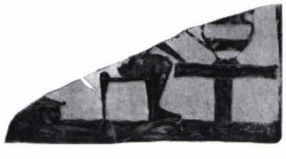
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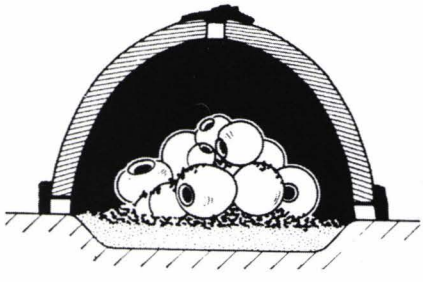

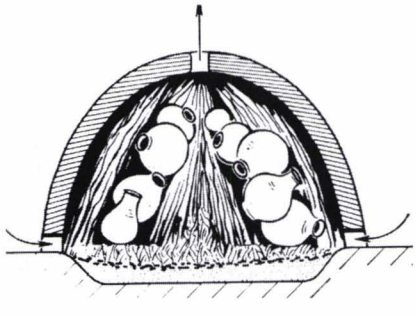
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Plate 1. 1. Reconstruction of use of kiln and potting (drawing: M. Lakó); 2. Evolution of the potter's wheel (after Kresz 1991); 3. Ancient Egyptian pottery making (after Biczó–Kulcsár 1987); 4–7. Ancient Greek potter's wheel; 8. Reconstruction of Neolithic pottery kilns (after Biczó–Kulcsár 1987); 9. Ancient Greek pottery kiln.

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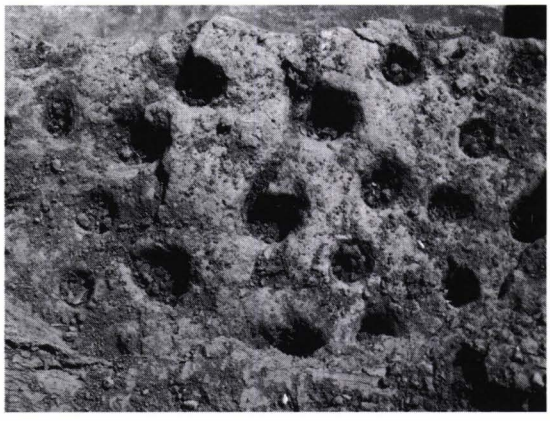
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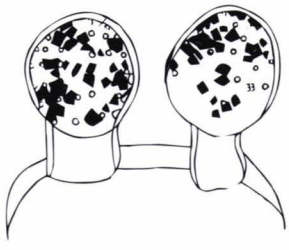

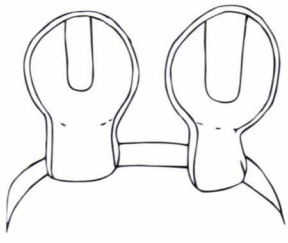
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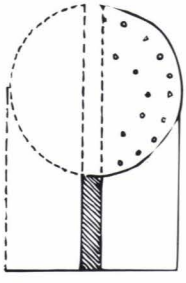

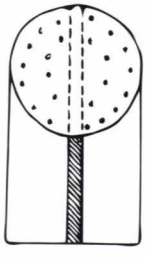

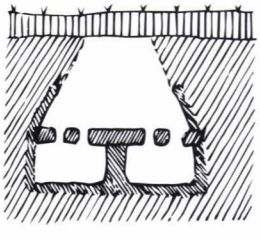

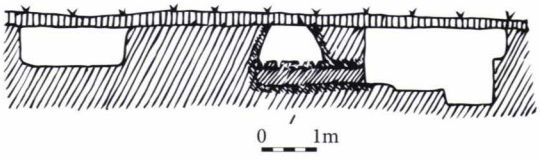
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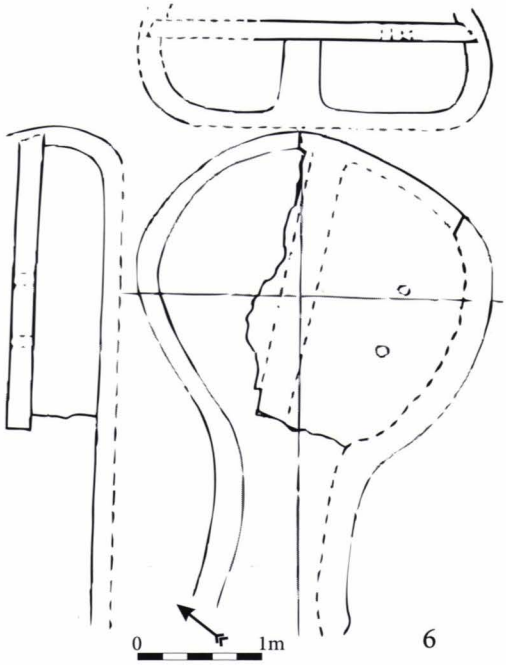

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Plate 2. 1–4. Part of a Celtic pottery kiln: 1. Stoke holes and firing chambers; 2. Raised floor of the kiln; 3. Two chambered firing place; 4. Pottery kiln in drawing; 5. Pottery kiln from Andrid–CAP; 6. Pottery kiln from Biharea (after Dumitrașcu 1982).

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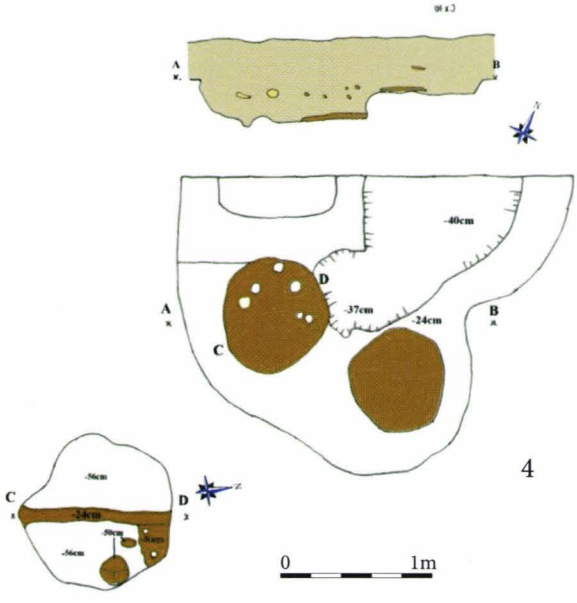

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Plate 3. Pottery kilns. 1. Căuceu, Bihor County; 2. Aghireș–Sub pădure, Sălaj County; 3. Carei–*By-pass road* CX. 100, Satu Mare County; 4. Carei–*Ferma Avicolă* CX. 10, Satu Mare County.

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The Metal Smiths' Settlement at Şimleu Silvaniei–Uliul cel Mic

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Keywords: Şimleul Silvaniei, Uliu cel Mic, Dacian hoards, Dacian craftsman, workshop

In 1951 a study of a collection of Dacian archaeological material from the Sfântu Gheorghe Szekler National Museum's (SzNM) inventory was published under the generic title of *Tezaurul dacic de la Şimleul Silvaniei*; these objects – of great historical as well as archaeological significance – however, did not reveal much about the nature of the discovery (Székely 1951). The book provides conflicting information, probably due to the difficulties the researcher – an individual with a high reputation – encountered in the course of a written dialogue with the original discoverer of the published material. The purpose of these discussions between Zoltán Székely and Iosif Bede (hereafter cited as I.B.), the original discoverer, was to shed light on the conditions and context of these finds. The absence of professional knowledge on the part of I.B., however, led to inaccuracies in the initial study, which in turn led to confusion in the professional literature.

In the first sentence of the report the year of discovery is stated as 1948; further, it is reported that a student found numerous silver bracelets (five in all, one of which was in fragments) and coins (sixteen *denarii*), a bronze bracelet, a silver neck-ring, seven fragments of a further silver necklace, three bronze fibulae, weapons and some iron tools, sherds, spindle-whorls and two clay beads. In the same location there was mention made of seventeen silver *denarii*. The final count of objects which Székely had to work with during his study is: 33 coins, seventeen sherds from wheel thrown pot, 25 sherds from hand-made vessels, two spear heads, a harness, a bridle, tools, 23 implements consisting of seven spindle-whorls, two pottery modelling tools, three whetstones, a flint blade, an iron spit, three knives, a brace, two fragments of bronze sheet, three unidentified objects, two glass beads, bronze jewellery: three fibulae, a ring, a bracelet, a bar and silver jewellery consisting of five bracelets, a torc, and seven fragments of a necklace (Pop 2008, 71–79).[1]

Of particular importance is the spatial and contextual information which the author provides based on information from the owner of the land and the late I.B. One is thus informed that the place of the discovery is located east of Şimleul Silvaniei, at a distance of half-a-kilometer on one of the peaks of *Măgura* (*Munte de Frasin / Kőrishegy*). This area, until 1946 a forest, was covered with trees. In 1946, when the locals started vineyard cultivation with water channels, some graves under mounds of round and oval shape were found. When the mounds were cleared the aforementioned objects were found at a depth of 1–1.5 m in the circular graves and 2–2.5 m in the oval ones. In one burial the bottom has not been found even at a depth of 3 m depth. The bracelets were discovered in two round mounds, in one of

1 I would like to thank to the management of Szekler National Museum from Sfântu Gheorghe, for setting to my disposal photo material about the finds from Şimleu Silvaniei.

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them the bracelets being situated near the lower part of a large pot, containing human bones and charcoal. Sixteen coins were in a small cup, placed in a large pot near in which human bones and a bronze bracelet have been found. The rest, seventeen coins and a fibula, were in the second round mound, in a pot; on a broken pot human bones have been found. Other sherds (Székely 1951, 43–44) were found around the graves. Even though osteological analysis did not take place – what happened to the calcined bones is not recorded – we are well informed concerning the funerary complexes, although their inventory does not necessarily point to such an interpretation. Moreover, I.B., after a brief introduction to the scientific literature, identifies a series of complexes investigated by him with overlapping graves of burial mounds, misinforming Székely about the so-called hoard.

From the total of fifty coins I.B. found on the spot, only thirty-three were sold to the SzNM, their dating being irrelevant to the dating of the other objects excavated. The discovery of three other coins (Matei 1979, 18, 29), found later in the soil, disturbed by vineyard cultivation, did not change the established date (Săşianu 1980, 168–170) proposed by Székely, i.e. second century BC–first century AD. It is not certain, however, that the other coins, which found their way to other museums' collections, are dated later.

The first systematic excavations at the location of the original discoveries were made on the initiative of the Institute of History and Philosophy of the R.P.R. Academy in July of 1949 following information received from Székely after he had acquired the pieces. The head of the project (M. Moga) correctly located the spot (with the help of I.B., the original discoverer), without mentioning his name in the archaeological journal. In copies of the original documentation of the dig site, which we acquired with the help of the late Fl. Medeleţ, Moga mentioned 1945 as the year of discovery, most of the objects from the site having been sold by then to the SzNM for the total sum of 20.000 lei.

A part of the pottery, the result of chance discovery, was in the possession of various locals. The surveys conducted by the research team took place close to Bede's vineyard, covering some 90 m. No archaeological complex has been found, only sherds of Dacian pottery. Rain, washing down mud from the vineyard, helped the archaeologists realize that in fact on that spot no proper settlement existed, but a single house structure and near it two cremation burials and two pits from which the material, now at the SzNM, was extracted.

In a list from the same archaeological documentation, Moga describes twenty-two objects acquisitioned from I.B.: nine containers and sherds, three spindle-whorls, a grinding stone, the upper part of an iron sickle, the bottom part of an arrowhead, a spur or buckle, an unidentified object, both made out of iron, a *meta* broken in two, three Roman denarii, two issued in 90 BC, one in 67 BC. Furthermore, the list contains pottery collected during the systematic surveys, and an iron chisel found with bone fragments nearby; there is no indication that they were burned or not. The pieces which are in the possession of the National History Museum of Transylvania, have inventory numbers V.21.601–21.746. The coins are now missing, but there are two knives and some Dacian pottery, numbering 145 pieces in total. Later Moga (1950, 131–135) states that '*we have not evidence of a settlement, but only an isolated dwelling surrounded by two graves and two pits*'.

D. Protase in his first monograph dedicated to the funerary rites of Dacians and Daco-Romans, states (Protase 1971, 48–49): "*he [Moga] does not write of "burial mound", unlike Székely, even though it could be named under the generic term of "grave". He makes a clear distinction between the "two grave"' and "two pits" found near a dwelling. Without lingering on the contradictory and unclear information given by the two researchers, we find that, unfortunately, today we cannot even tell the exact number of graves discovered on Măgura (possibly two?), or their form (both a mound over the grave and a larger burial mound, or simply a burial mound, or only pits) nor the distribution of items by graves, etc. The situation at Şimleul Silvaniei is very unclear, that is why there is a need for new excavations and precise observations at the site of this archaeological complex*".

New excavations took place only in 1978, when the late Al. V. Matei from the County Museum of History and Art from Zalău (MJIAZ) conducted six verification surveys, in the area now named *Kiskeselyű / Uliul cel Mic*. Previously, in 1975, on the occasion of an surface survey undertaken at *Măgura Şimleului*, the discoverer of the hoard, as indicated by Székely took the researchers to the exact spot of the find. Rapidly publishing the results of his surveys and discussions with I.B., Matei (1979, 17) unwittingly complicating the situation, stated that "*some of the objects transferred to Sf. Gheorghe were*

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uncovered at a shallow depth of 0.2 to 0.25 m, and the rest of the material was found in some 5–7 pits identified and emptied which were discovered when the terrain was surveyed. The Dacian silver ornaments were not found in one place, but separately and thus not forming a true hoard. The Roman coins, some fifty pieces in all, were collected in spring, from the surface after constant rain washed the mud off them rendering them easily spotted".

In 1975 MJIAZ purchased several pieces discovered by I.B. in the same area, namely a whole cup with handle, two solid fibulae (Rustoiu 1997), grinding stone, and several Dacian pottery both coil-built and wheel-thrown.

Six new cuttings were excavated in 1978. Matei (1979, 18) states that "*four circular pits have been discovered more or less grouped together, without evidence of burning and with a diameter of approx. 0.40 m to 0.60 m and a depth of 0.60–0.80 m, penetrating approx. 0.20–0.30 m into the bed-rock. In these pits were found Dacian hand-made and wheel-thrown pottery, numerous animal bones, and a few cremated human bones placed towards the bottom of the pit. We consider these pits to be Dacian cremation burials*".

The surveys further revealed the remains of two Dacian dwellings (?), poorly preserved due to the marked slope of the hill with an inclination of 30–45 degrees, and three Roman coins, from the same area where the approx. fifty coins were found in 1948. The conclusion drawn by Matei (1979, 18) was that "*[...] at Uliul cel Mic on Măgura Şimleului there was a small Dacian settlement, in the same area as cremation burials have been found in pits. There were not any mound burials found in this area*". The chronological range proposed by the author was from the end of the second century BC (judging from the dating of the pottery) to the end of the first century AD at the time of the Roman conquest, dating roughly on the basis of the markedly shaped bronze fibulae. The brief publication of the 1978 survey results and its finds and the absence of osteological analysis at the time, have maintained the confusion surrounding the *Uliul cel Mic* site. The contradictory information provided by the initiator of the excavations (I.B.) has made a clear scientific approach nigh impossible.

Moreover, this suspicion was confirmed during a discussion the present writer had in 1990 with the author of the 'mis-information'; at the time he was approx. 75 years old. He maintained that the work associated to the vineyard which made the discovery possible, had begun between the years 1945–1946 when there was still snow on the ground. He also said that soil there never freezes, because of the average exposure to the sun. At his home he still had a piece of iron, supposedly from a mill, a spindle-whorl and fragments of Dacian pottery. He recalled how he found five pits, arranged in approximately two parallel rows, with a distance of approx. 2.5–3 m between them; he also stated that the burial mound had been flattened by the work in the vineyard. The cylindrical pits were approx. 1.2 m deep penetrating some 0.4–0.5 m into the rock. The diameter of these pits was less than one meter (approx. 0.8 m). The coins were scattered in thick, black soil at the bottom of the pit. The pits also contained burnt bones and ashes. The pits were found between calcinated bones, in one of which I.B. discovered a whole pot, found inverted. Besides the already-known pieces located in the Museum, he remembered a 10 cm long bronze needle, a bronze ring, seven or eight bronze bracelets, a ring of stone (sic!), decorated with three blue stones arranged in a circle, with a triangular shape, possibly a glass eye-bead and approx. seven or eight bronze fibulae. The coins were found in two stages, firstly eighteen examples, two of which wer subsequently stolen, then a second batch of seventeen coins, all of which were sent to the SzNM. The other coins, found later, were sold to a medic from Zalău (6), Baia Mare (5), 5 more spread through sale, three also sold to a doctor from Şimleu, probably a member of Moga's team.

There were therefore, a total of 54 silver Roman coins and with the three found during the 1978 surveys, all-in-all 57 pieces. I.B. did not sell the coins personally, the transaction being made by a nun from Şimleu. Knowing how to read and write, he conversed by letters with Székely, thus having the opportunity to learn more about history and archaeology. The payment for the museum pieces came in two instalments, first 15.000 lei, then 8.000 lei in 1948. I.B. was convinced that similar findings could be dug up on the opposite, northern slope, unexposed to sunlight, arguing that a local peasant had found silver coins there which he gave to him.

Indeed, following the surface examination conducted in recent years, the presence of Dacian pottery was proven on both sides of the hill, the northern slope having two access routes. From the west, approach is possible by climbing to the westernmost point of Măgura Şimleului, following the trail and passing by another peak located in front of the discussed one. The second route is the pass connecting

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the hill to the rest of *Măgura*, 2–5 m wide. Above *Uliul cel Mic* there is another hill, which does not have a clear way of access, where more pottery has been found, dating identically to the ones found on *Uliu cel Mic*.

So far, we are unsure about the nature of this discovery, even though it can be linked to a possible surveillance point, with the ability of watching over the territory on *Uliul cel Mic*. This spot, however, not having good visibility towards the gorge of the river Crasna, could not have served any military purpose. The steep slopes do not encourage the settling of this area, nor does the lack of a near-by water source. Moreover, contemporary Dacian settlements have been identified at the base of Măgura Şimleului and the fortified residential area located on the highest plateau of Măgura dominating the entire Depresiunea Şimleului. And yet, following new archaeological research, opinions about the nature of the site were about to take an incredible turn.

In an article preceding the resumption of archaeological research on *Uliul cel Mic*, the present writer had been questioning (Pop 2002, 41) the existence of dwellings due to the lack of clear arguments or observations regarding this aspect. A fire-place, discovered in 1978, does not necessarily imply the presence of a home; likewise, it can mean an *ustrinum*. The osteological analysis[2] of the batch of 127 bones discovered by Matei in 1978, states that fifteen are animal bones, two-thirds being domesticated animals, most of them, 33.3% were pigs, followed by cattle, sheep and goats totalling 20%, the situation differing from compared the statistics obtained from the contemporary fortified acropolis located on the central and higher plateau at *Observator*, where cattle predominate.

The dating of these older finds is partially supplied by Dacian pottery found here, which in turn is dated with the help of the fibulae from the same area. The typology includes objects discovered in Şimleul Silvaniei, at the point mentioned earlier (Rustoiu 1997). Its time frame ranges from middle of the first century BC to the middle of the first century AD. The middle of the first century BC marks the start of settled living in the aforementioned location, although an earlier date could be possible. Just like the coins, the fibulae found confirm the first half of the first century AD to be the final date for dwellings in the area. These three precisely shaped fibulae[3] with Western characteristics, types Rustoiu 19a and 19c (Rustoiu 1997, 52–53) are chronologically between the second half of the first century BC and the first half of the first century AD. The fourth fibula belongs rather to the Nauheim type rather than to the filiform form, having a bilateral, short catch-plate and interior chord (Székely 1951, 48, fig. 4/13), 'soldier-like' type 9a (Rustoiu 1997, 42–111). The Naunheim model's Dacian time-frame extends from the middle of the first century BC to the start of the first century AD (Rustoiu 1997, 46), in this case, matching the chronological frame indicated by the other pieces. The fifth fibula from *Uliul cel Mic* was published by Székely; it belongs to the type 22b 'with broken bow', bilateral short catch-plate and interior chord. The piece can be dated between the end of the first century BC and first quarter of the first century AD (Rustoiu 1997, 56), again confirming the proposed time-frame for the discussed site (for a summary of the fibula evidence see: Pop 2007; 2008).

Ornaments of bronze and silver do not really help with dating (Rustoiu 1996, 89–128), but the chronology provided by the fibulae completes the picture suggested by the ceramic material which is contemporary with the acropolis at *Observator*, discussed earlier, which in turn ceases to exist somewhere in the first of half of the first century AD (Pop–Bejinariu 2000, 243–245).

Starting with the year 2007 archaeological research was restarted at Şimleul Silvaniei–*Uliul cel Mic*, and continued, uninterrupted, up to 2011. Research was focused on the northern slope, which was steeper, but archaeologically untouched.

The sites drawn in 2007 were numbered following in sequence the ones examined in 1978: VII–VIII (Fig. 1). The research in 2007 led to the recovery of 28 more denarii and two Dacian silver ornaments in close proximity to S IV (Pop 2008, fig. 67–70), surveyed in 1978, and on the northern slope, un-investigated, there were traces of man-made terraces which contained evidence of Dacian metal workshops. The excavation units established in 2008 were a continuation of those ones examined between 1978 and 2007 (S IX–XI) and were restricted to the northern slope of the hill. The archaeological complexes

2 Analyses were made by Georgeta El Susi, to whom we thank.

3 One item was published by Székely (1951, 48, fig. 4/16). The same fibula has been published by Crişan (2000, pl. 114/4), as being from Comolău, probably due to an error in the archives of SzNM. The other two fibulae of the same kind have been published by Matei (1979, pl. VI/1–2).

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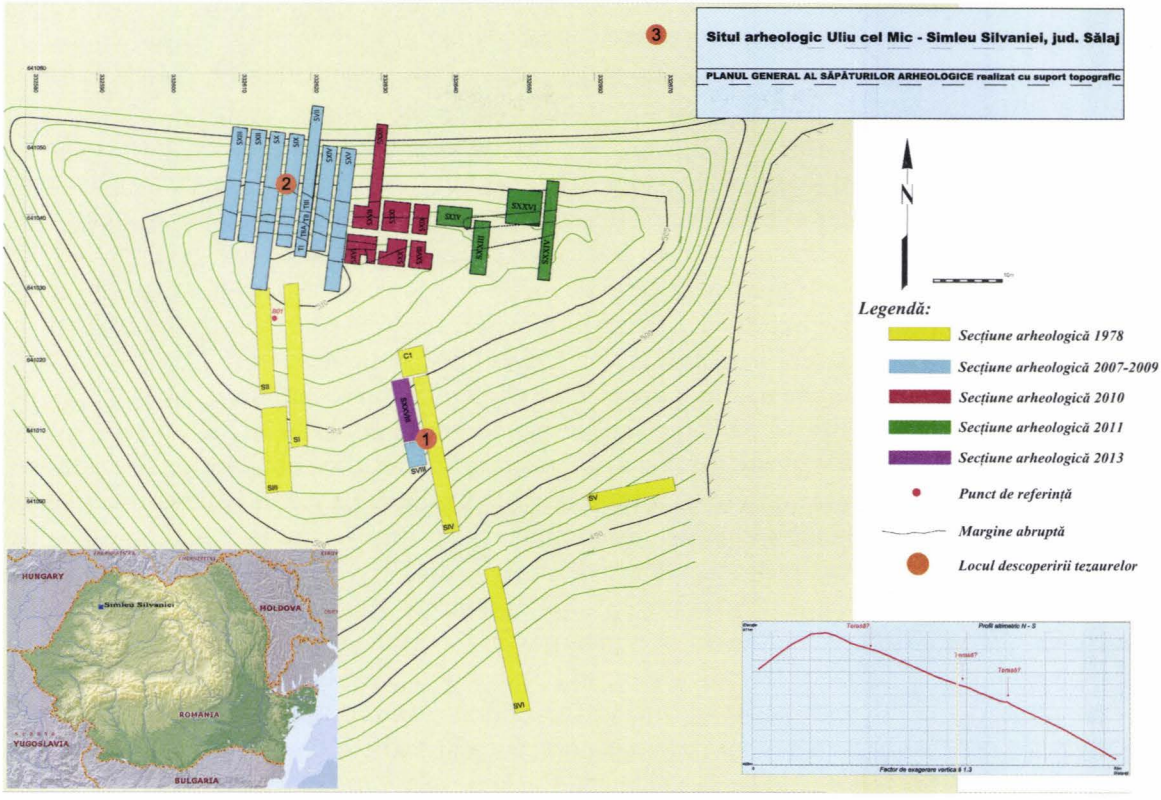

Fig. 1. Şimleu Silvaniei–*Uliul cel Mic*. The excavations.

likewise followed the pattern established in from 1978 and 2007 and in 2008, five such complexes having been discovered (waste pits, post-holes and hearths). The inventory of finds contains mostly of classic Dacian pottery, especially from the first century BC. The pottery is usually fragmented, but on the T3 terrace whole storage-jars have been found. Generally they are hand-made, only about 15% being wheel-thrown. The hand-made pottery contains (most commonly) bowls, cups and mugs. The wheel-thrown pottery, on the other hand, is more varied: fruit bowls, kantharoi, mugs, jugs, bowls and cups. From a numerical point of view, however, the prevailing materials are the metal (iron, bronze, lead, silver), some discovered by field surveys on the northern slope. The variety and large quantity (mirror fragments, peaks of silver and bronze, iron and bronze fibulae, knives, arrowheads, building materials, iron and bronze scrap, etc.) is unusual for a Dacian settlement of this date, the unfavourable conditions for settlement, forms a distinct image of the character of the surveyed site. Twelve denarii come from the fill of the T3 terrace scattered on the slope and settlement area. These objects can be seen as raw material utilized in the workshops for the crafting of silver ornaments, or perhaps copies of coins.

Trench S XI of 23 × 4 m (Fig. 1) was laid out on the northern slope in the area of the pass linking the hill to the Măgura Şimleului, because of a Roman denarii found during a field survey. No traces of habitation have been found in this area. Investigation in this area led to the discovery of a small hoard scattered on the steep northern slope of the hill. The hoard, consisting of twenty coins – the last one found in August 2013 – is the third discovered on this site and it is the subject of this study. Regarding finds of this kind from the region of Şimleul Silvaniei, this collection is the eleventh discovered.

In 2009–2011 research again focused on the northern part of the hill with the object of conducting a thorough investigation regarding the settlement terraces (Pop *et al.* 2008; Pop–Pripon 2009; Pop–Marchiş 2010; Pop 2011; 2012). Directly on top of the exposed rock an isolated hearth was detected. The hearth (complex C27) has an approximately circular shape with a diameter of 0.6 m. On the T3 terrace only post-holes have been discovered (complexes C23–26) with depths of no more than 0.25 m probably part of the sheds protecting the metal workshops. The density of the materials recovered suggests that we are probably on the western outskirts of a landscaped area inhabited in antiquity.

Furthermore, lasts, spindle-whorls, grinding stone, miniature pots, nails, clasps and a fragmented iron knife have been found. From the category of special materials remarkable is a splendid complete

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bronze fibula of Neuheim form (found in S XIII, T3) and a bronze ring decorated with the image of a horse. The ring is unfortunately poorly preserved, lacking a big part of its link and showing signs of heavy corrosion. Other objects found are metal fragments and iron tools (needles, chisels, screw taps, and an arrowhead). Of special mention is a resort with a bronze fibula pin (S 19, T3).

Since the resumption of research an area of 504.7 square meters has been investigated by 26 excavation units, revealing 28 complexes on the four arteficial terraces identified on the northern slope (Fig. 1). The first hoard has been supplemented with 28 more coins and two more ornaments while a new hoard has been found (= Şimleul Silvaniei hoard no. 10), consisting of twelve coins spread out on the terraces on which metalworking activity (Pop 2008, 94–95) took place. It is increasingly apparent that we are dealing with the discovery of a settlement more precisely a settlement of Dacian craftsmen, probably catering for the tastes of the aristocracy on the fortified settlement from *Observator*, situated at an approx. 500 m distance on the overlooking plateau of Măgura Şimleului. Very likely, the dwellings of the master craftsmen were located on the terrace on the southern slope, while the working space was located on the opposite slope, the northern one, with an entrance but also subjected to cold winds.

With continuance of the research and its resumption on the southern slopes where the actual settlement seems to have been located, it will hopefully complete the picture of a unique and unusual discovery in the north-western part of pre-Roman, Dacian Transylvania.

The eleventh hoard from Şimleul Silvaniei (= *Uliul cel Mic* no. 3) is new proof of the prosperity of the Dacians living in at Depresiunea Şimleului, benefiting from the strategic location of the fortifications established here which controlled all trade routes, and probably exacted taxes from through trade, specifically in salt, leading to the prosperity of the local aristocracy. The accumulation of tribute provided the beneficiaries with both currency to exchange and raw material for the fabrication of ornaments, enhancing their prestige. This would seem to explain the large count of hoards found in the surroundings of Şimleu and the ubiquitous occurrence of workshops present at sites throughout the Măgura Şimleului.

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List of figures

Fig. 1. Şimleu Silvaniei–*Uliul cel Mic*. The excavations.

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Composite Artefact Discovered in the Celtic Cemetery of Fântânele-La Gâţa (Bistriţa-Năsăud County). Data on Use-Wear Analysis and X-Ray Computed Tomography

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The village of Fântânele (commune of Matei, Bistriţa-Năsăud county) is known in the literature due to some important archaeological discoveries of different periods. The Celtic cemetery discovered in the place *Dâmbu Popii*, dated to the fourth–second centuries BC (Crişan 1975a, 185–186; Crişan 1977, 67–84; Dănilă 1978, 257–275; Vaida 2006) is one of the most important from Transylvania (Pl. 1/1). At about 3–4 km south of *Dâmbu Popii*, in the boundary part called *Livadă*, several adornments and clothing accessories were found by chance in 1970. It was established that the artefacts come from a cremation burial which proved to be one of the richest Celtic funeral complexes known in Transylvania. I. H. Crişan dated the grave to the LT C1 (Crişan 1975b, 41–56; Vaida 2006).

The third site where Celtic burials have been recorded at Fântânele is locally called *La Gâţa* (Vaida 2008, 237–246), placed 2 km northeast from the village (Pl. 1/1–2; 2/1). The archaeological investigations carried out by staff of the Bistriţa-Năsăud County Museum had as a starting point the repeated accidental discoveries made by people while exploiting the sand, activity which has been carried out in this area for many years. In the spring of 1999, the Bistriţa Museum succeeded in collecting more clay vessels saved from two cremation burials previously destroyed. In the autumn of the same year, excavations began at the *La Gâţa* location. Excavation was made mainly in parallel trenches, 1.5–2 m wide and 10–40 m long. As a result there is now a sampled area of more than 1000 m^2. A total of 34 Celtic inhumation and cremation burials were uncovered between 1999 and 2013 (27 cremation burials and 7 inhumation burials). Unfortunately, the number of the destroyed graves and their lost inventory because of the sand exploitation will never be known.

The relatively wide distance between the graves could be explained by the fact that the burial area is situated on a very large ridge which enabled the positioning of the grave pits to be made over a virtually

Iron Age Crafts and Craftsmen in the Carpathian Basin, 2014, p. 217–232

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unlimited surface. Some shallow graves were affected by the mechanized agricultural works during the second half of the 20th century. These works caused the fragmentation of the associated pottery.

These burials have analogies not only in the cemetery of *Dâmbu Popii*, but in other Celtic cemeteries too. The grave pits had a round, oval, rectangular or irregular form and their depth varied from 30 to 130 cm. The inhumation burials were found generally at a shallower depth than those of the cremation graves. Regarding the inhumation burials, one may observe the varied position of the skeletons according to the cardinal points of the compass. Thus, it is obvious that there were not any rules regarding their position. More precisely, the position of the skeleton is more or less different for each of the seven graves belonging to this rite. There is no strict rule regarding the arranging of the bodies in the graves. What must be remarked is the fact that, unlike most Celtic inhumation burials found in Transylvania where the human bodies were laid on their backs with the arms along the body, three skeletons were found in the crouched position. This kind of deposition of the bodies was also noticed in the cemetery of Pişcolt (Németi 1992).

Cremation is the most common burial rite in the cemetery. Human ashes were found directly on the ground without being deposed in a funerary vessel. On other occasions remains were gathered in one or more heaps, or scattered at the bottom of the pits. With other burials the burnt bones were found in the area of the graves but at different depths, a part of them being scattered while the grave pits were being filled up. The excavation campaign of the year 2008 brought to light the first cremation burial with the ashes deposited in an urn vessel. This is an important discovery because there have been serious doubts regarding the existence of such burials in the Celtic cemeteries from northeast Transylvania. The fragments of the human bones were put in a typical deep Celtic wheel-thrown bowl inverted and covered by another vessel, placed upside down.

Animal bones were found in most of the cremation burials as well as in an inhumation grave. These bones come from the food offering and they all belong to domestic animals. The pig was the favourite one (*Sus scrofa domesticus*), parts of its skull, ends of its limbs or ribs were placed in the pit. Cattle bones (*Bos taurus*) and fowls (*Gallus domesticus*) were also identified.

The grave goods from the Fântânele-*La Gâţa* Celtic cemetery consist of different categories of metal and clay artefacts. These objects generally have numerous typological parallels in Transylvania and in other Celtic areas as well. Some of them find their similarities in the territories of the Scordisci. Generally, the grave goods of cremation burials are richer than those of inhumation graves, but the quantity of finds differs from one case to another. In the only grave belonging to a warrior (grave 15) the following things were found: a sword with its scabbard, a chain sword-belt, a horse-bit, an oval shield boss and fragments of the shield binding-strip, a single-edged knife blade, an arrowhead, a pair of shears and seven pots of different shapes. The horse-bit found in this grave is one of the most carefully worked from Transylvania for this period of time. The piece was also very well preserved, and all its component parts and their role was easily established. It is worth mentioning that the piece was covered by bronze, as the imprints show. The inventory of the other graves included amongst other types three more horse-bits, knives (*Hiebmesser*), bronze and iron bracelets, fibulae made of bronze and iron, glass and clay beads, pieces of belt or ornamental plaques made of bronze and iron, whetstones. The entire inventory has been deposited in the museums of Năsăud and Bistriţa (Bistriţa-Năsăud County).

Based on analogies, the graves can be dated from the beginning of Middle La Tène (LT B2, first half of the third century BC) to the end of LT C1 when the other Celtic cemeteries from Transylvania also cease to exist.

A large number of pots which very likely contained food offerings were found in the graves. The number of the vessels found in the cremation burials is clearly bigger than those in the inhumation graves. There are few cremation complexes which did not contain pottery, and there are examples of graves containing nine vessels of different sizes and different shapes. The vessels were typical Celtic wheel-thrown profiles, and also hand-made forms of local origin.

There is no evidence yet of the contemporary settlement nor have there been indications belonging to any Celtic dwelling nearby. Even so, the great number of funerary discoveries in a limited area, which is not larger than 5–6 km, indicates a similar situation for the contemporary communities. The probable density of Celtic settlements was surely due to the environmental conditions favourable especially for agriculture.

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Grave 40 from Fântânele-*La Gâța* was unearthed during the excavations carried out in the 2012 season. This was an inhumation burial belonging probably to a man, with an oval funerary pit, with a depth of 0.50 m; the skeleton was oriented NW–SE and it laid on its back with the arms crossed over the pelvis (Pl. 2). The grave inventory consisted of a single artefact recovered from the area of the left arm – an iron tool (probably a stitching awl) with a roe deer antler haft. The piece is preserved in the collections of Năsăud Frontier Guards Museum, Năsăud (VAIDA *ET AL.* 2013).

The artefact – unique for Iron Age Transylvania – has been subjected to a complete analytical procedure taking into account the present methodology which is applied in cases of the study of bone industries (BELDIMAN 2007; SZTANCS 2011) – all data provided by optical microscopic examination of the surfaces: tracéologie, use-wear analysis (standard optical microscope, zoom ×10–40; digital microscope, zoom ×25–400) are collected in order to highlight the sequence of manufacture and usage (Pl. 5–7). This methodology has already been applied for other Late Iron Age (Dacian) bone and antler artefact assemblages from Romania (BELDIMAN 2012a; 2012b; 2012c; BELDIMAN *ET AL.* 2012; 2013a; 2013b; BELDIMAN–CÂRCIUMARU 2013; FERENCZ–BELDIMAN 2012).

In recent years, the interest of the scientific community in characterizing objects belonging to cultural heritage has continuously increased. X-ray computed tomography (CT) is one of the non-destructive examination methods used in the fields of archaeology and cultural heritage (CASALI 2006; HANECA *ET AL.* 2012; MORIGI *ET AL.* 2007; TUNIZ *ET AL.* 2012). CT provides information about the structure of objects that cannot be disclosed by any other way than through destructive investigations or sampling. CT examinations are also meaningful for restoration and conservation purposes. The most common way of performing X-ray tomography is in transmission mode which consists in directing an X-ray beam towards an object and then measuring its attenuation from multiple directions. The X-ray beam attenuation depends on the X-ray energy, path length and on the material from which the object is made (KETCHAM–CARLSON 2001). Specialized algorithms are subsequently used for the reconstruction of the imaged object, usually implemented by a computer programme (KAK–SLANEY 2001).

The CT device employed in this study was specially designed for the studies of cultural heritage artefacts made out of low-Z materials – e.g. clay, bone, antler and wood. The X-ray tomography machine and the software employed for the reconstruction algorithm were developed in the Department for Applied Nuclear Physics at the "Horia Hulubei" National Institute for Physics and Nuclear Engineering, Măgurele, Romania (CONSTANTIN *ET AL.* 2010). It contains a compact X-ray source from a Spellman High Voltage Electronics Corporation (160 kV maximum X-ray tube voltage, 3 mA maximum current intensity), a positioning system, capable of rotation and translation movements and a Varian PaxScan flat large dimension panel detector (40 × 30 cm^2). The detector is made from amorphous silicon (127 mm pixel pitch) engineered for high-speed radiographic imaging. The spatial resolution that can be acquired using this CT machine is around 300 mm. This tomograph can be used to investigate small objects with a maximum volume of 20 cm^3 (CONSTANTIN *ET AL.* 2010). To realize the image reconstruction, special software based on a modified Filtered Back Projection algorithm was written using Microsoft Visual C++ 2005 (CONSTANTIN *ET AL.* 2010).

The working procedure consisted of two main steps: (a) adjusting the position of the object with respect to the incoming X-ray beam; (b) the actual CT scan of the object using the parameters optimized for tomography examination (for example the parameters for the ceramics objects are: 70 kV X-ray tube voltage; 700 μA X-ray tube current). The whole object volume is scanned in 120 steps, representing a 360° rotation of the object around its central axis. The partial images are rounded to obtain the final projection. The acquisition time necessary for a full tomography scan is roughly five minutes, while the image reconstruction lasts for less than four minutes. These relatively short times needed for a complete tomography examination allows the screening of a large number of objects.

The stitching awl found in grave 40 is a quite common composite artefact made of iron and roe deer antler. It is a fragmentary piece, in a medium status of conservation. The piece was recovered with the metal part *in situ* and partially recently detached (fractured) – while cleaning the piece. Its total length is about 125 mm (Pl. 3).

The active part of the piece is made of iron in a medium state of conservation, heavily oxidized, with a thick layer that did not allow the examination of surfaces and of the initial morphology. There are traces of burning, while partial exfoliations and dislocations can be observed at the distal and medial

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parts. The piece has been recently fractured and detached from the haft – the traces of the oblique fracture are preserved at the proximal part. On a length of approx. 20 mm the proximal part and the proximal end are preserved in the haft. It has a square or rectangular section. The artefact was made by hammering of a small piece of iron. The proximal part probably had an elongated pyramidal shape. The metal piece was fixed in the haft on a length of approx. 26 mm (Pl. 3–4). The dimensions of the iron point are: initial length approx. 89 mm; preserved length 68.96 mm; proximal part 6.12 / 4.27 mm; medial part 4.15 / 3.91 mm; distal part 3.07 / 2.41 mm; proximal part preserved in the haft: length approx. 20 mm; maximum width 4 mm; proximal end 2mm.

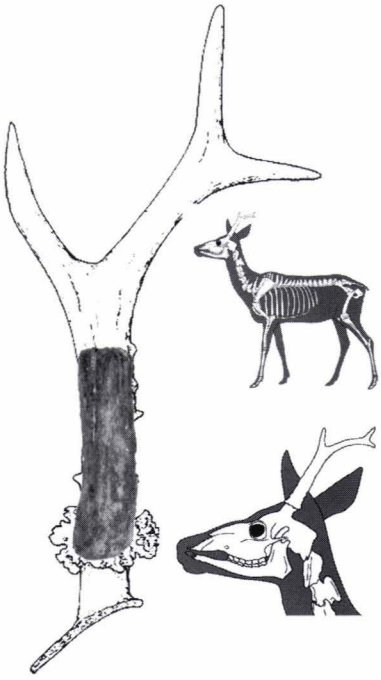

Fig. 1. Roe deer antler haft, origin of raw material (drawing after Billamboz 1979).

The haft made of roe deer antler has been cut from a basal segment of the left beam probably shed by a juvenile deer. The medium conserved piece is strongly corroded by the plant roots and discontinuous traces of burning. It was recently fractured (and glued) at the distal part; three recent axial fissures can be also observed which affected the distal, the medial and the proximal part. About 1/3 of the distal part circumference is missing from a length of 12 mm, recently fractured and lost. The proximal end is convex and asymmetric; the distal one is oblique with irregular edges and the sections are oval and asymmetric (Pl. 3).

The débitage was made by extracting a basal segment of the beam with the anatomic end (burr) using direct percussion or chopping applied on the entire circumference using a massive blade (probably of an axe) and fracture at about 65 mm of burr (Fig. 1; Pl. 5–6). Shaping was realised by removing or smoothing the anatomical morphology using chopping: burr, beam relief. Traces of impact are preserved on an area of the proximal end; at the proximal part an area of splitting of the compact tissue can be observed on an elongated trapezoid plane of fracture. At the distal end, traces of oblique chopping are preserved, these resulted from the débitage sequence. The edges of chopping were probably shaped by knife chopping observed due some uncertain traces that were eliminated by the surfaces corrosion. The perforation was shaped at the distal part. It was shaped axially, probably by carving and rotation in the spongy tissue of pointed part of a metal tool. The perforation is conical elongated, with an approx. 26 mm depth. The iron piece was inserted in it. There are no traces of antique glue (Pl. 4/9–12; 5). The use-wear traces like bluntness and polish of the modified anatomic relief of the beam and fine striations were poorly preserved due to the corrosion and burning.

The artefact was most probably used as a stitching awl (Pl. 7); a perforator for hide working or tool for sewing, but it also might have been a weapon. Its total length is 62.20 mm; the proximal end is 17.32 / 15.30 mm; the proximal part is 16.86 / 15.45 mm; the medial part is 15.45 / 15.16 mm; the distal end is 16.55 / 16.17 mm; diameter of perforation at distal end approx. 7 mm; perforation depth approx. 26 mm.

Analysing the projections of the object (Pl. 3/4), the exact insertion point of the metallic sharp implement in the handle made out of antler can be seen. The tomographic examination allowed us to obtain the correct shape and dimensions of the internal metal part of the awl and of the haft, details that cannot be otherwise spotted at the surface examination with the naked eye.

Tools and weapons made from two parts – the cutting or piercing part of iron fitted in bone or antler handles – are rare and still not studied systematically from the technological point of view. An analogy for the piece from Fântânele–*La Gâța* is known from Vinţu de Jos, Alba County (Ferencz 2007, 137, pl. XCVI/4; Ferencz 2008, 100, pl. V/2), but in this case the handle was not preserved (Pl. 8/1), however from the site red deer antler waste is known (Pl. 8/2) (Ferencz 2007, 55, 135, pl. XCVI/5–6; Ferencz 2008, 100, pl. V/3). The category of composite artefacts includes the knives (Pl. 8/3–4), like those discovered in Satu Mare County at Ciumeşti (Pl. 18/3) (Zirra 1968, 39, 81–82, fig. 36/M28/IV), Moftinu Mic (Pl. 8/4) (Németi 2010, 185–187, 190, pl. III/1) and Pişcolt (Németi 1992, 187).

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The artefact discovered in the inventory of grave 40 offered the opportunity for a first close technological analysis of a Celtic composite tool discovered in Romania, where similar pieces of Celtic origin are rare. The piece has elements partially preserved *in situ*; despite the relatively poor conditions of conservation, all the sequences of the analysis have been applied. The traces of manufacture of the haft and the use-wear traces were identified with the help of the optical means. In order to establish precisely the inner morphology of the roe deer antler haft, the X-ray Computed Tomography analysis has been applied for the first time in the study of a Celtic piece discovered in Romania. The fact that similar pieces having Celtic origin are still rare in Romania increases the importance of the studied artefact. The piece in proper state of conservation was put in the grave of the owner that has used it during his life for hide working or sewing. This is a quite common composite artefact (stitching awl) so it is difficult to stress that the owner was a craftsman. The artefact indirectly proves for the first time the practice of hide processing and sewing related crafts among the Celts from Transylvania.

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List of figures

Fig. 1. Roe deer antler haft, origin of raw material (drawing after BILLAMBOZ 1979).

List of plates

Pl. 1. 1. The Celtic cemeteries from Fântânele; 2. Aerial view of Fântânele–*La Gâța* (photo: S. Berecki, November 2013); 3. Fântânele–*La Gâța*.

Pl. 2. Fântânele–*La Gâța*, grave 40. 1. General view; 2. Detail view; 3. Stitching awl *in situ*.

Pl. 3. 1. Stitching awl; 2. Roe deer antler haft; 3. Iron point; 4. X-ray Computed Tomography.

Pl. 4. 1–8. Microphotographs of the iron point; 9–12. Microphotographs of perforation and the iron point inserted in haft.

Pl. 5. Roe deer antler haft 1–2. Distal part; 3–10. Microphotographs of distal end..

Pl. 6. Roe deer antler haft. 1. Proximal part; 2. Microphotographs of distal end; 3–14. Microphotographs with traces of manufacture.

Pl. 7. Microphotographs with traces of use.

Pl. 8. Celtic composite artefacts from Romania. 1. Iron awl from Vinţu de Jos (after FERENCZ 2008); 2. Red deer antler waste from Vinţu de Jos (after FERENCZ 2008); 3. Iron knife with bone haft from Ciumeşti (after ZIRRA 1968); 4. Iron knife with red deer antler haft from Moftinu Mic (after NÉMETI 2010).

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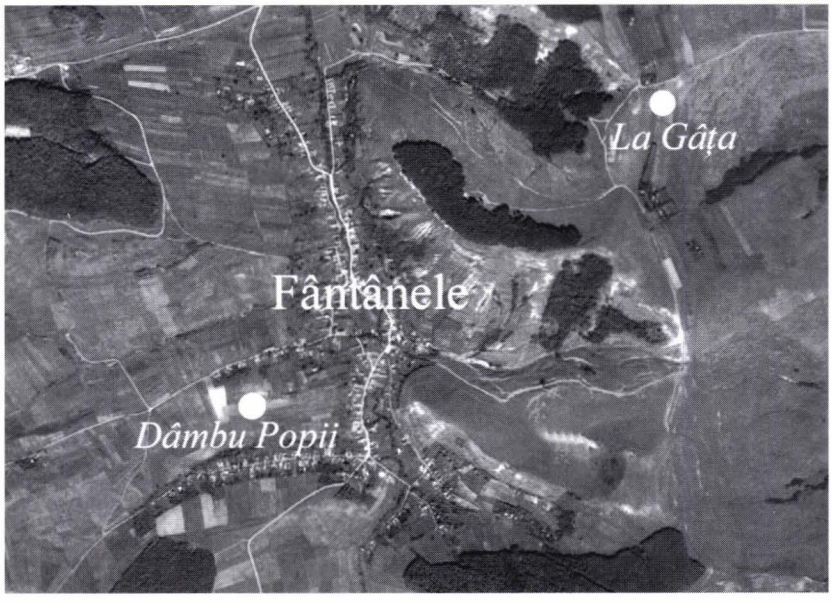

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Plate 1. 1. The Celtic cemeteries from Fântânele;
2. Aerial view of Fântânele–*La Gâța* (photo: S. Berecki, November 2013); 3. Fântânele–*La Gâța*.

https://biblioteca-digitala.ro / http://muzeulmures.ro

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Plate 2. Fântânele–*La Gâța*, grave 40. 1. General view; 2. Detail view; 3. Stitching awl *in situ*.

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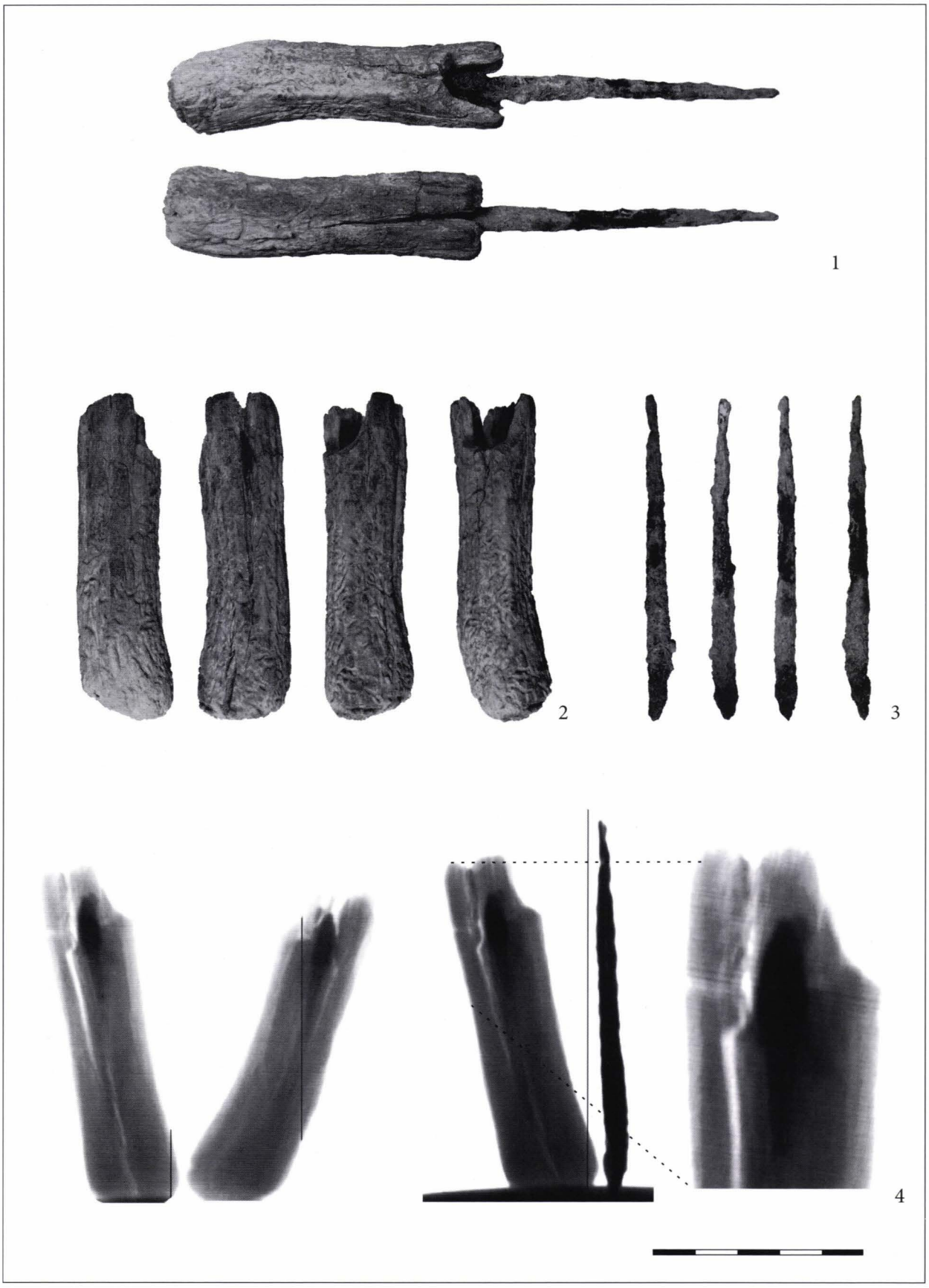

Plate 3. 1. Stitching awl; 2. Roe deer antler haft; 3. Iron point; 4. X-ray Computed Tomography.

https://biblioteca-digitala.ro / http://muzeulmures.ro

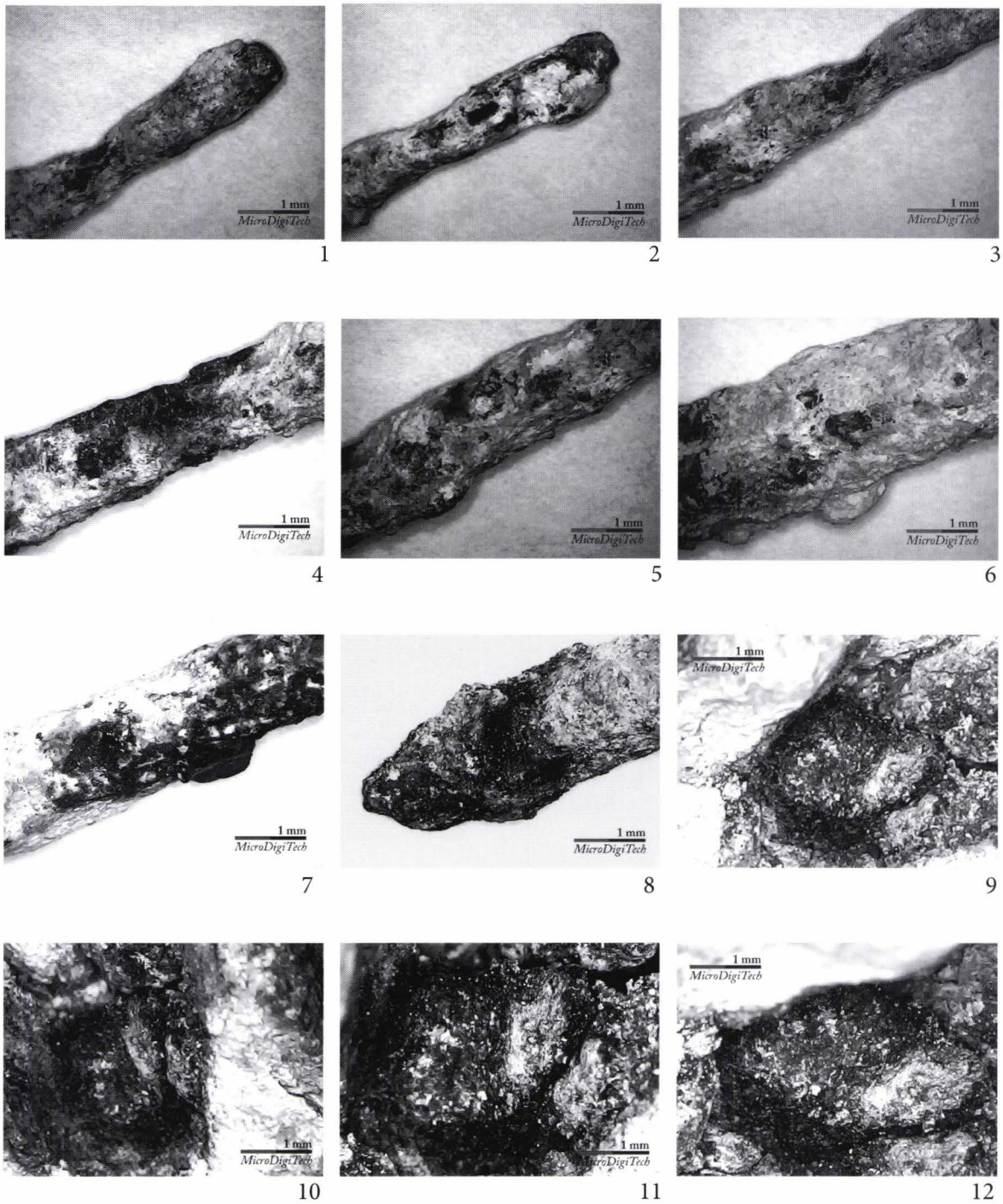

Plate 4. 1–8. Microphotographs of the iron point;
9–12. Microphotographs of perforation and the iron point inserted in haft.

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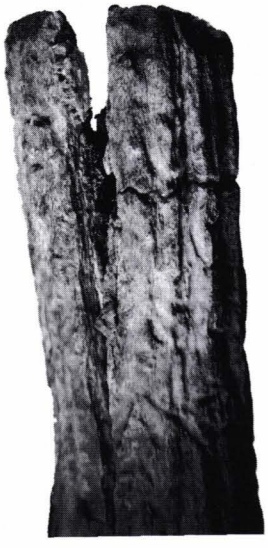

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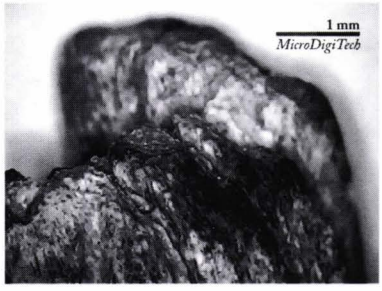

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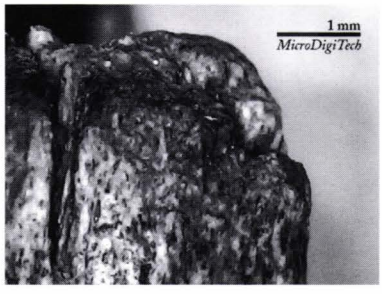

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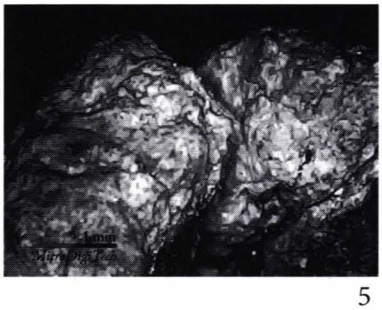

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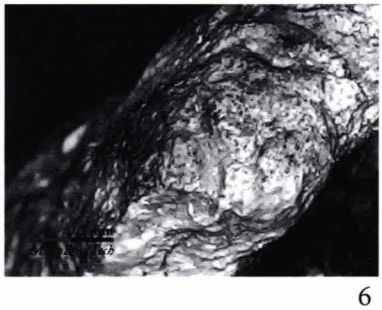

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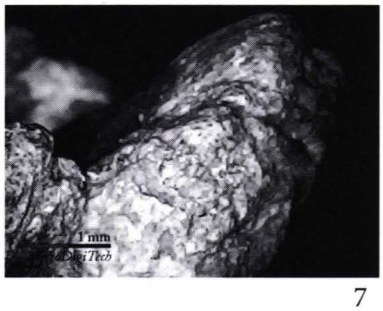

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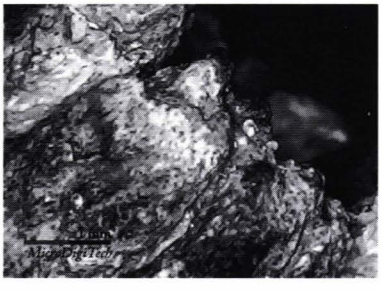

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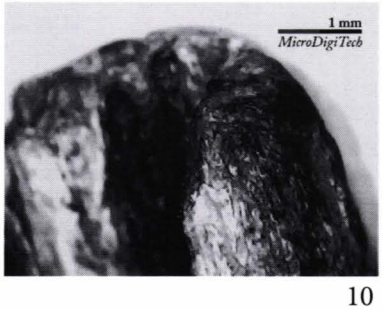

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Plate 5. Roe deer antler haft. 1–2. Distal part; 3–10. Microphotographs of distal end.

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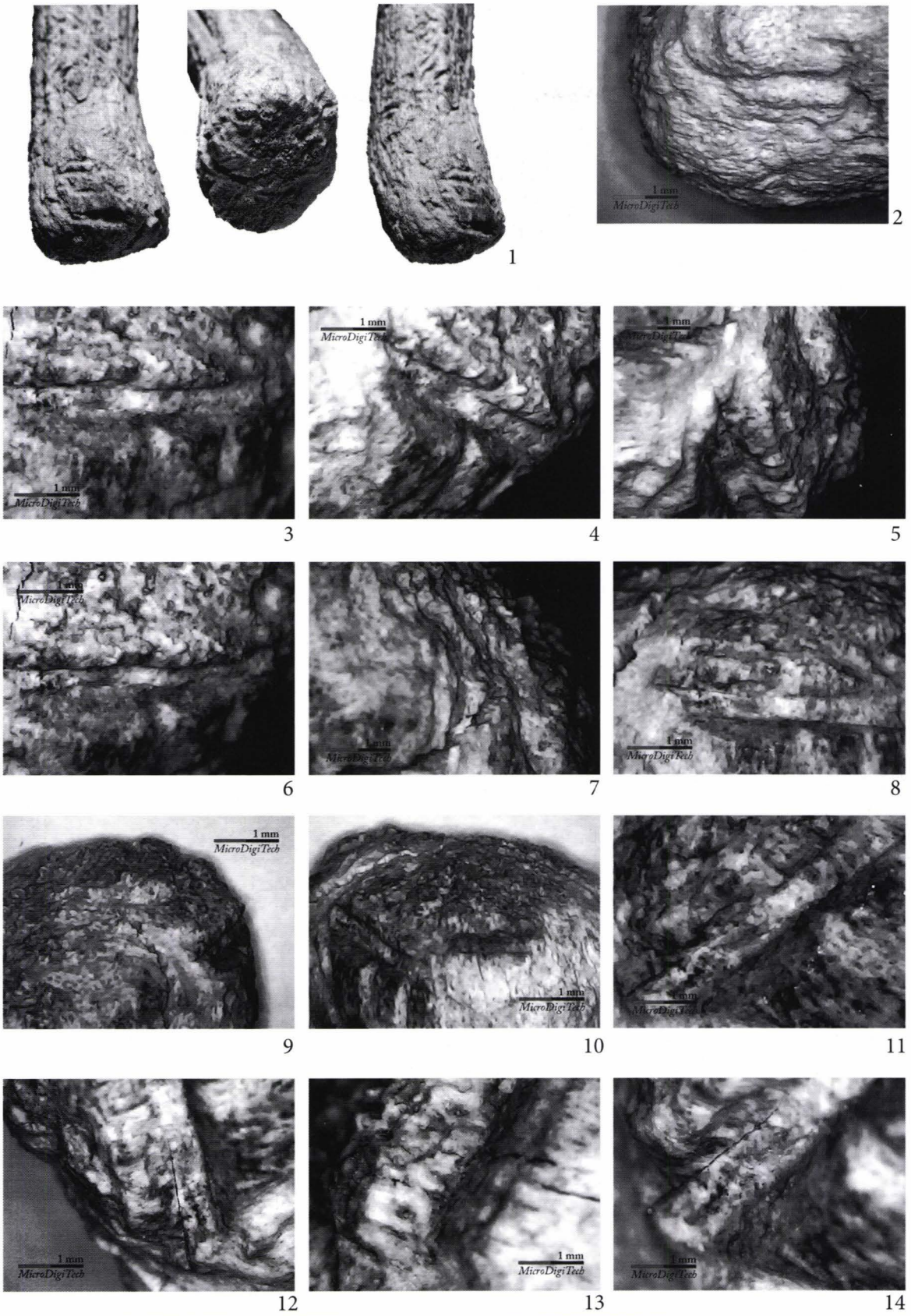

Plate 6. Roe deer antler haft. 1. Proximal part;
2. Microphotographs of distal end; 3–14. Microphotographs with traces of manufacture.

https://biblioteca-digitala.ro / http://muzeulmures.ro

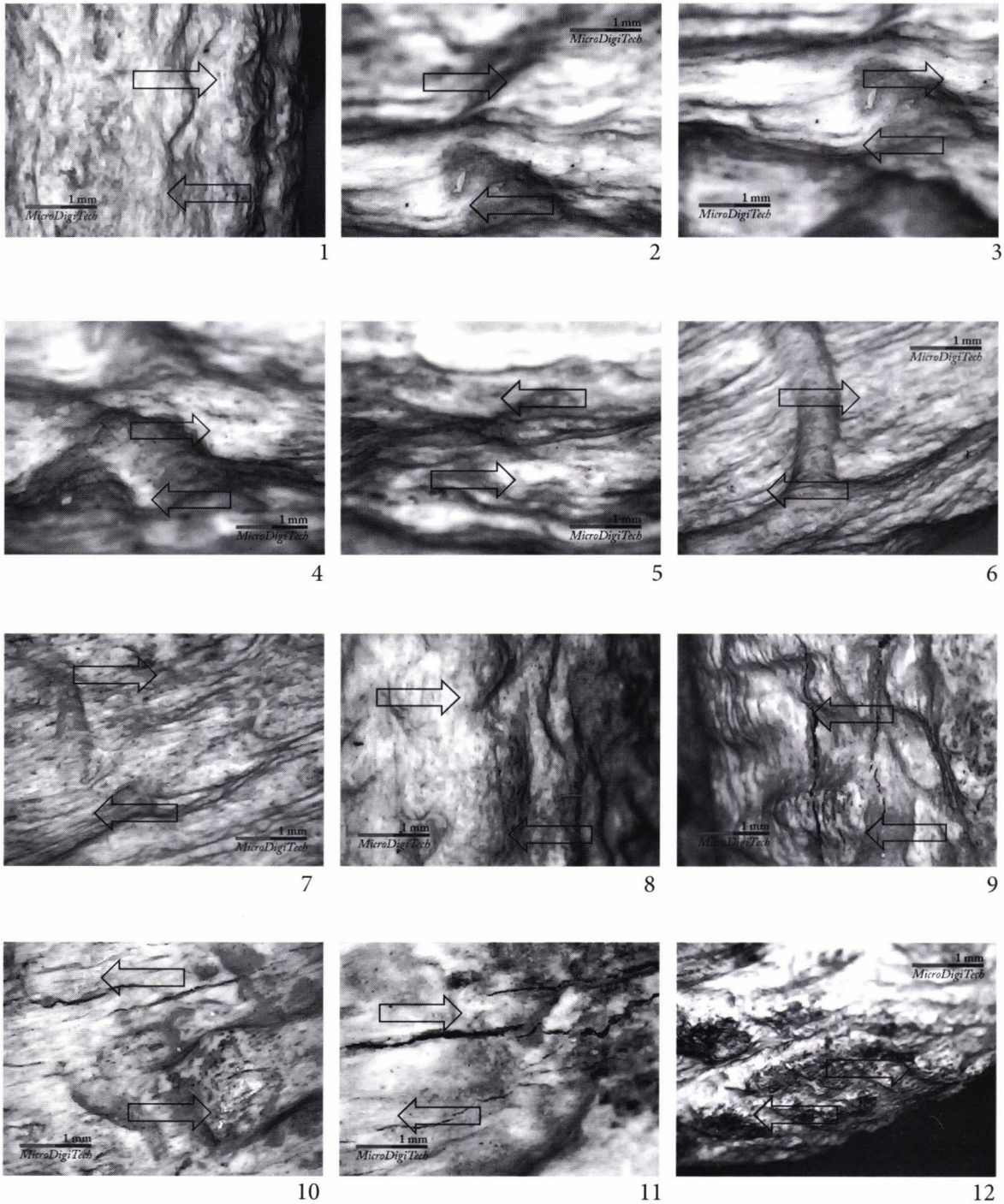

Plate 7. Microphotographs with traces of use.

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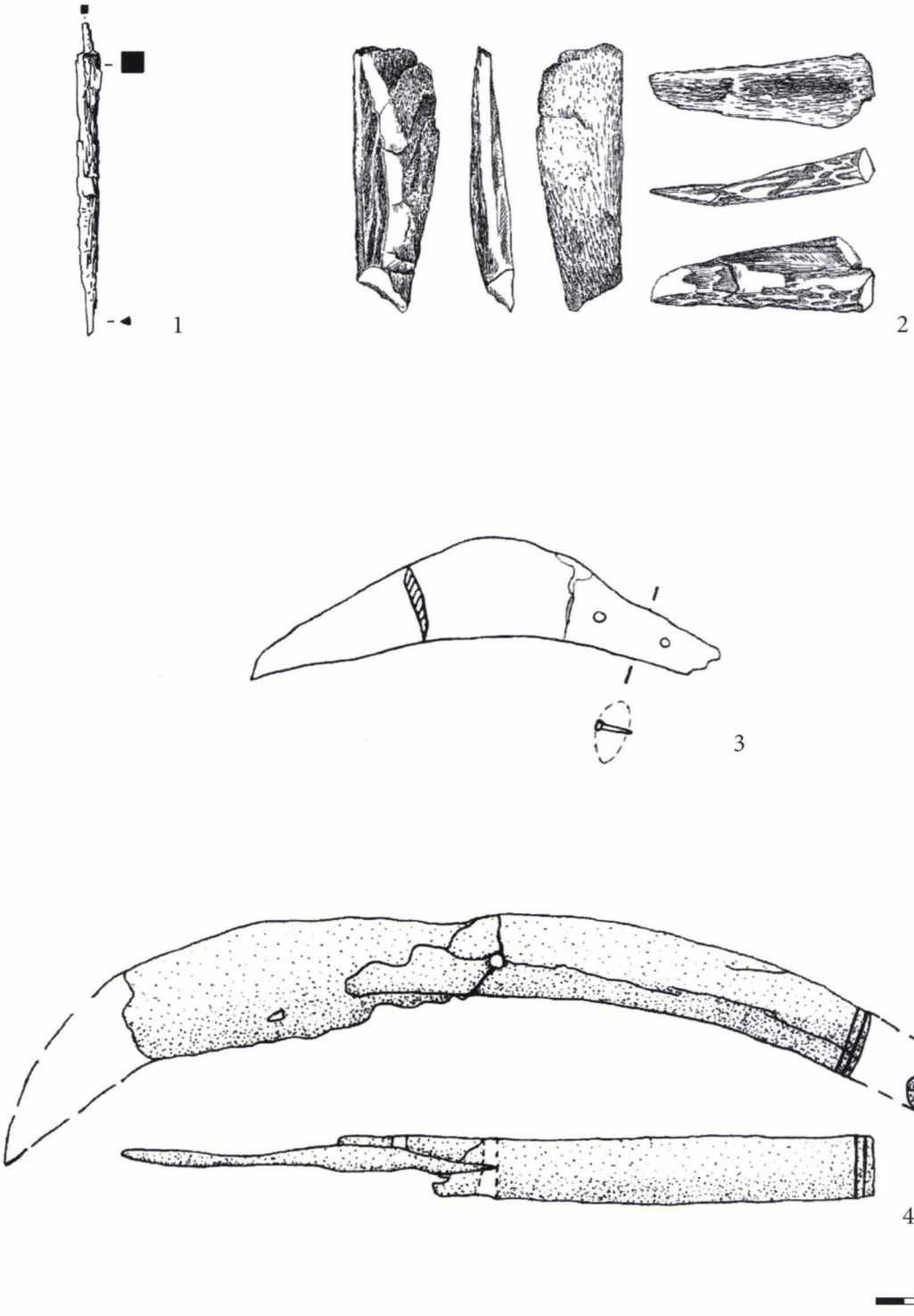

Plate 8. Celtic composite artefacts from Romania. 1. Iron awl from Vinţu de Jos (after Ferencz 2008); 2. Red deer antler waste from Vinţu de Jos (after Ferencz 2008); 3. Iron knife with bone haft from Ciumeşti (after Zirra 1968); 4. Iron knife with red deer antler haft from Moftinu Mic (after Németi 2010).

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Desirable Goods in the Late Iron Age – The Craftsman's Perspective

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Keywords: craftsman, desirable goods, ceramic technology, metal technology, cultural interaction

To begin with a question – what makes goods desirable? The manner in which archaeologists have tried to respond to this question during the last decades reflects the gradual change in theoretical approaches seeking to explain the appearance and functioning of differing ancient social and political structures. From this point of view, two key concepts are relevant – demand and value. Many anthropological and sociological studies suggest that both concepts are the result of differing social, political and economic practices, and are also subjective and dynamic through time and from one community to another (Douglas–Isherwood 1980; Appadurai 1986, 29–31; Castillo *et al.* 1996, 8–9; etc.). Social, political and economic competition provide an arena in which both demand and value are created, transformed and consumed within various practices that are not necessarily elite-bound,[1] although the upper echelons of any community are those which usually set up the models which are followed, modified or contested by other social categories. As a consequence, the goods (and even agricultural produce or foodstuffs; see the discussion in van der Veen 2003) perceived as having a higher social, political or/and economic relevance in a given society become desirable.

In archaeological literature these are frequently considered to be 'prestige goods' – valuables whose production, consumption and circulation were controlled by various individuals or groups in order to establish and maintain social, political and/or economic power and authority (Frankenstein–Rowlands 1978; Brumfiel–Earle 1987; see also Castillo *et al.* 1996, 8–9; Plourde 2009). Several features were taken into consideration for their classification as prestige goods, for example particular physical or visual characteristics and properties, the complexity or difficulty of acquisition, the ability to incorporate and signal complex ideological messages or display qualities in carefully coded and restricted practices (Appadurai 1986, 38; Hayden 1998, 12–13; van der Veen 2003, 408; Plourde 2009, 266; Smith 2013, 144).

It is commonly considered that the appearance and circulation of prestige goods contributed significantly to the development of social hierarchy and competition due to their ability to signal personal power and authority (Stein 1996, 25; Hayden 1998, 11–12, with further bibliography). The idea that such goods have an intrinsic high value, which makes them suitable for expressing or reiterating someone's status and authority, has been recently challenged (Plourde 2009, 265–266 and 274) as a circular

1 It is frequently considered that only the elites were engaged in various forms of social competition, but nearly every individual and certainly every social group was engaged, in one way or another, at various levels and scales, the degree being markedly different and mainly determined by the social dynamic of each community and its reactions to internal and external factors (political, economic, cultural, demographic, etc.).

Iron Age Crafts and Craftsmen in the Carpathian Basin, 2014, p. 233–248

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argument; it has been instead suggested that they are only one of many possible signals of status whose value was purposefully created and maintained within certain social or economic practices.

At the same time, the concept of a 'prestige goods economy' played a significant role in the development of the 'core–periphery' model of the 1970s and 1980s (Rowlands 1987; Champion 1995; Stein 1998) that sought to apply the world-systems theory (Wallerstein 1974) to archaeology. The chief aim was to identify and explain the interaction between complex socio-political entities and their supposedly less-developed neighbours. One consequence of this interpretative model was the attempt to correlate the social and political development of different Iron Age communities from the temperate Europe with the intensity of their contacts with the Mediterranean world. From this point of view both concepts were subsequently criticised mainly for putting too much emphasis on foreign objects, which were too scarce and sparsely distributed to sustain consistently the suggested consumption pattern. At the same time, these interpretative models tended to overlook both the locally-made prestige goods and, more importantly, the internal socio-political and economic structural transformations experienced by many Iron Age communities (Gosden 1985, 489–491; Dietler 1990, 355–356; Dietler 1998, 295–298; Pare 1991, 191; Woolf 1993; Pitts 2010, 32–34; Wells 2006, 145). Among many other things, these gradual transformations led to the appearance and development of particular means of expressing individual and collective identities and status which varied through time and from one region to another, and included, for example, feasting or funerary practices, or monumental architecture, which must have primarily involved locally sourced goods, services, agricultural produce and foodstuffs.

Nevertheless, the increasing interaction with the Mediterranean region offered the possibility to obtain certain foreign goods and services that fitted pre-existing patterns of consumption related to the aforementioned practices and for whom the so-called 'distance value' (Cline 1999, 122, note 13, with further bibliography) was an added quality. That is not to deny the concerns of some individuals or political and economic entities from the Mediterranean world in supplying the interested parties from temperate Europe, taking advantage of the existing demand for certain categories of goods and maybe even attempting to create demand for new ones. Experienced merchants, artisans and emissaries must have known, in one way or another, what kind of goods would be most welcome in foreign lands.

It also has to be noted that the aforementioned interpretative models were centred on the elite's consumption, whereas the impact of desirable goods on the ordinary people was frequently neglected because most specialists presumed that the latter category had limited interest in, or access to, such things, and they only used locally-made basic and abundant goods. However, there are several examples (Cline 1999; Smith 2013, 144–145; Egri 2014a; etc.) indicating that distance increased the symbolic value of some otherwise mundane goods reaching far away regions, yet they remained fairly accessible economically for the ordinary people, for whom they fulfilled an elitist function. From this point of view the presence and circulation of various foreign or locally-made desirable goods during the Iron Age allowed the specialists to carry out complex analyses regarding their symbolic and practical appropriation, or their impact on various social, political or economic aspects of the lifestyle of many indigenous communities (e.g. Dietler 1990; 1996; Pare 1991; Knüsel 2002; Poux 2004; Pitts 2010; Egri 2012; 2014a; Rustoiu–Egri 2011; etc.).

In this context, the apparent connection between craft specialisation and the socio-political dynamic of the elites was already noted (Brumfiel–Earle 1987; Stein 1996; Hayden 1998), taking into consideration the ability of this social category to control the primary sources of desirable goods – raw materials and skilled artisans – and also the main means of circulation and distribution. From the organizational point of view, researchers often differentiate between so-called 'independent' specialists, who produced goods in response to the wider demands of various categories of customers while controlling most if not all phases of production, and the 'attached' ones, who were closely connected to elite consumers and often produced custom-made goods. In the latter case these consumers also provided protection, support and resources, and controlled the output. Nevertheless, this classification may not necessarily correspond to the actual social or juridical status of the individuals involved in this kind of relationship; for instance there are cases in which skilled 'court artisans' enjoy a high social status (Brumfiel–Earle 1987, 5–6; Hayden 1998, 25–26). Furthermore, the too neat differentiation between 'independent' and 'attached' specialists seems to be more like an ideal interpretative model, since in practice there were several intermediary categories or individuals whose activities did not allow such a clear classification.

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For instance, one regularly 'independent' craftsman might have occasionally become an 'attached' one while working in a particular environment, perhaps fulfilling a one-off order, in which his ability was highly regarded or/and scarce. The work of some Greek masons and architects in the area of the Orăștie Mountains in Transylvania (Pl. 1) during the 1st century BC, as discussed below, provide a relevant example of this situation.

On the other hand, from a technological perspective, there were many kinds of craftsmen during the Late Iron Age, from the highly specialised ones, who mainly worked in larger settlements and were sometimes able to mass-produce top quality goods, to the jack-of-all-trades who knew a little bit of everything, but were able to fulfil only modest orders or to repair damaged objects (Wells 1996a, 223–226; Wells 1996b, 92–93, Meylan *et al.* 2002; Rustoiu 2009, 8–9). Further differentiations may have existed within this rather heterogeneous socio-economic category, based on the manner in which manufacturing activities were organized and carried out within different communities and groups of artisans. The craftsmen involved in the production of desirable goods more likely belonged to the category comprising highly skilled specialists. Furthermore, the concentration of specialised manufacturing activities in larger settlements and dedicated quarters during the Late Iron Age may have increased the output of certain desirable goods, and some of them may have been gradually 'democratised' due to a combination of emulation and increased availability, reaching some of the non-elite consumers (the so-called 'trickle-down effect'; see van der Veen 2003, 409–410 with further bibliography). In many cases, this phenomenon triggered the appearance of new practices related to social and political competition and status display, which were centred on other means of expressing power and authority, and other norms and scenarios of consumption.

Regarding this particular category of goods, it has to be noted that mostly the consumer's perspective was taken into consideration, whereas the producer was in many cases relegated to the rather mono-dimensional role of primary source or provider. Some studies discuss the impact of craftsmen's mobility on the circulation of certain technologies or fashion trends during the Late Iron Age, or the often complex relationships between some highly skilled artisans and various elite groups (Rustoiu 2002; 2009; Venclová 2002, 73; Stöllner 2010; 283–285; Rustoiu–Berecki 2014; etc.). On the other hand, the difficult problem of knowledge transmission through apprenticeship or other means is far less tackled (although see Karl 2005, mainly based on literary evidence, and Rustoiu–Berecki 2014), and the same can be said about the questions regarding the craftsmen's social status, or their specific manner of expressing individual and collective identity within different communities (for funerary contexts see Stöllner 2007).

Taking into consideration the aforementioned observations, this article focuses on the activities of different foreign and indigenous specialised craftsmen in the eastern Carpathian Basin and the Lower Danube region during the Late Iron Age, and more specifically on the ways in which they dealt with the local demand for desirable goods. The case studies brought into discussion belong to the period between the 1st century BC and the beginning of the 2nd century AD.

Desirable goods in the eastern Carpathian Basin and the Lower Danube region

Before discussing the means through which desirable goods were obtained in the regions of study during the last two centuries before the Roman conquest, and mostly the role played by specialised craftsmen in this process, it is necessary to identify the objects and the related services that can be included in this category. As stated above, desirable goods needed to incorporate certain features related to their particular physical characteristics or/and difficulty of acquisition; the ability to incorporate and signal complex ideological messages in carefully coded and restricted practices was also important. However, a single shiny or spectacular object may not necessarily be relevant for the social, political or economic competition within the community or any other social group, since it may have been only an occasional or accidental acquisition, or part of the personal belongings of an individual, thus being left aside from any local competitive practices. As a consequence, the complex analysis of such practices and of their practical purpose and symbolic meaning in specific contexts is the key to the identification of prestige goods in any given society.

Some prior analyses indicate that in the region in question social competition and the expressing of individual and group identity mainly centred on particular convivial (Egri 2008, 107–120; Egri

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2014a) and funerary practices (Rustoiu 2008, 142–148 and 158–163; Egri–Rustoiu 2014), costume and bodily ornamentation (Rustoiu 2002; Egri–Rustoiu 2014), and monumental architecture (Florea 2006, 6–8; Florea 2011; Egri 2014b). There are significant regional variations within these categories and practices, mainly related to local socio-political and economic structures and dynamics, and they involved both local and foreign goods and services. Direct information regarding the ways in which local desirable goods were obtained and distributed is scarce, but one may reasonably presume that they involved some form of control over the relevant sources of raw materials, agricultural produce and manufacturing activities. Archaeology may help in this case; for example, it has already been presumed that the production and circulation of gold was strictly controlled by the royal power whereas silver (including silver coins) may have also been restrictively used (Medeleț 1993; Egri 2014b, 173, n. 4). Wine, and especially foreign wines, provides mainly inside the Carpathian range another case of carefully controlled consumption of a symbolically charged substance (Florea 2004; Egri 2008, 107–120; Egri 2014a).

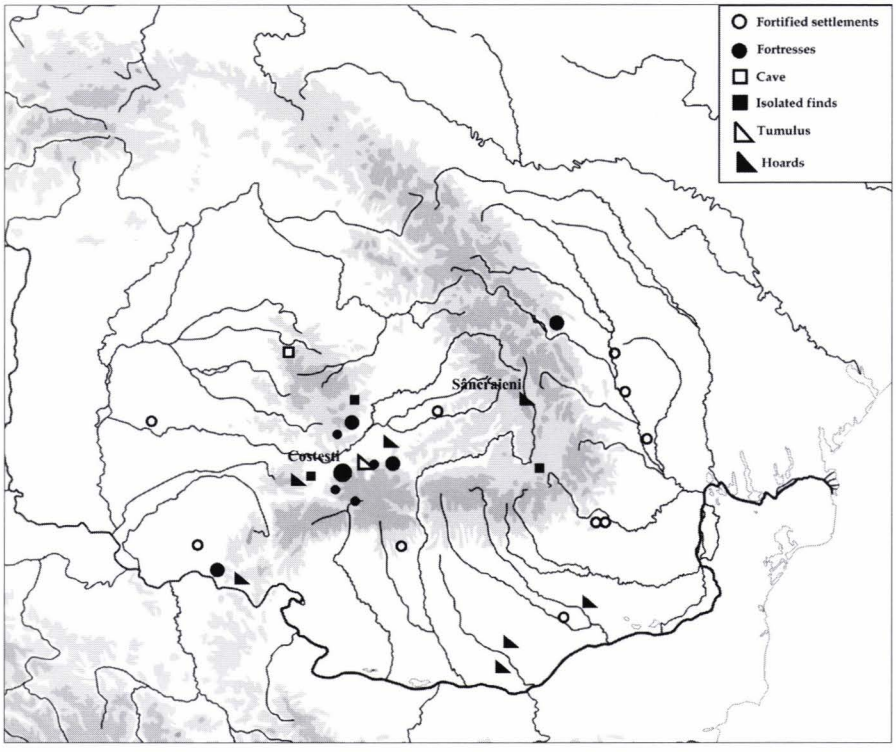

Fig. 1. Distribution map of the imported metal vessels (after Egri 2014a).

On the other hand, local consumers resorted to a variety of means through which they obtained desirable goods of non-local origin. These might have come as part of local, regional or long-distance commercial exchanges, as diplomatic gifts, booty, stipend, tax in kind and so on. One example is the distribution of Late Republican and Augustan metal vessels in the region in question (Fig. 1), which suggests a mainly elite-centred or elite-controlled circulation and consumption (Rustoiu 2005; Egri 2008, fig. 6.3; Egri 2014a, fig. 5). Another example is provided by the distribution of imported wine amphorae and other wine-related vessels (Pl. 2), which displays a more socially diffuse consumption pattern outside the Carpathian range and again an elite-centred one in Transylvania (Egri 2014a).

Some local consumers, especially those who were able to provide specific raw materials, also resorted to other means that allowed them to get direct access to certain desirable goods by bringing over skilled craftsmen willing to organize their manufacturing on the spot and according to the needs and taste of the customer. Some of these artisans might have come as independent individuals looking for clients, markets and resources. Others may have come as part of a diplomatic agreement; a few literary sources, as well as archaeological evidence, point to this practice. For example, according to Cassius Dio (LXVII. 7.4), Domitian provided military engineers and constructors as part of the so-called 'peace treaty' with Decebalus in AD 89.

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This practice was not restricted to the 1st century AD, as archaeological evidence points to the presence of architects, masons and other specialists coming mainly from the Greek world, in earlier contexts belonging to the 1st century BC from the area of the Orăştie Mountains, in south-western Transylvania. Their presence in Dacian fortresses was interpreted as a result of the domination exerted by Burebista over the Greek colonies on the western Black Sea coast (Crişan 1977, 342; Glodariu 1983, 28–29). These fortresses were not only socio-political and economic centres of power and control, but also highly visible symbols of status which may have also played an important role in social competition (Florea 2006; 2011, 89–94; Egri 2014b, 173; see also Lockyear 2004; Oltean 2007, 76–88). In general, their construction must have required the concentration and control of significant resources (building materials, as well as both a skilled and unskilled workforce), but some of the fortresses from the Orăştie Mountains had the added quality of being built by highly skilled foreign masons using prized foreign techniques (Pl. 1). As a consequence, these structures stand out amongst other functionally similar local constructions due to their different, finely crafted masonry and architectural details suggesting strength, order and control.

It can be therefore argued that in these situations the specialists themselves and their trade became desirable goods which circulated and were exchanged as an important part of, and contributor to, a complex visual and symbolic language incorporated into the local social and political structures and networks of interaction. One may also presume that the social and economic status of these people might have changed in this way, as many lived closely to their new masters, an aspect which will be further discussed below.

Foreign and local skilled craftsmen

The presence and activity of different foreign artisans is well documented archaeologically in a series of fortresses, fortified settlements and large manufacturing and commercial centres both inside and outside the Carpathian range during the last two centuries before the Roman conquest. Still, until now no evidence has been found of the existence of any separate living quarters for the newcomers on such sites as those located on the Siret valley, but this can be mainly the result of quite limited investigations of the civilian settlements, which unearthed only some structures (research has mostly focused on the acropolis; see Ursachi 1995, fig. 1; Vulpe–Teodor 2003, fig. 1). However, sufficient relevant archaeological traces of their activities and of the impact of their presence on the daily life of the indigenous population have been identified. On the other hand, the existence of at least one such area devoted to their living quarters, perhaps similar to the one identified at the Magdalensberg in Noricum, may be presumed at Sarmizegetusa Regia in Transylvania due to the frequent presence of some Greek and many Latin graffiti (Pl. 3/1–3) indicating ownership on imported, local and hybrid tableware (Florea 1993, 104, fig. 6/3–5; Florea 2000; 2001). This practice of marking personal possessions is a characteristic of people sharing a communal living space (Egri 2007, 44–45, with further bibliography).

There are some important observations concerning the presence of foreign craftsmen in any given community. First, they tend to preserve many elements related to their ethnic and professional identity, setting them apart within the indigenous environment. One example is the cremation grave from Brad (Pl. 3/4–10) which contains a funerary inventory specific to the Roman Danubian provinces of the 1st century AD, consisting of a whetstone, a beaker, a small *kantharos*, a plate and a *turibulum*, all ceramic, and a glass cup (Ursachi 1995, 258–265, pl. 338, 357). The funerary rite and ritual, as well as the grave's isolated position outside the settlement, in a period in which indigenous burials are extremely rare, suggest that the deceased was a foreigner originating from one of the neighbouring provinces. He might have been a merchant or a craftsman who met his end in the Siret valley and was interred by other foreigners, perhaps compatriots who were aware of the specific funerary practices and performed the required funerals.

Another important observation is that foreign craftsmen tended to adapt their trade to the local demands by incorporating certain indigenous features. The resulting hybrid objects must have been perceived as more appropriate in the local environment without loosing their distinctiveness. One example concerns the relief-decorated hemispherical ceramic cups which imitate Hellenistic prototypes (for production centres and dating in the Hellenistic world see Rotroff 1982). Although only a small number of imported cups come from a few Dacian sites, indigenous imitations have been found on almost every

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site outside the Carpathians (Pl. 2/1), including several rural settlements and some aristocratic tumulus graves (Vulpe–Gheorghiță 1976; Irimia 2006; Egri 2014a). Fabric analyses, as well as systematic studies regarding the characteristics and distribution area of any of the Dacian workshops are lacking, so they were identified only through the presence of some moulds and wasters (Pl. 2/2–5). The existence of a few other workshops was presumed on account of some specific decorative patterns (Irimia 2006, 74). It has been considered that the specific mould-casting technique was initially introduced by Greek potters as the first locally made vessels display typical Mediterranean motifs. However, the potters quickly integrated decorative details which were specific to the local environment, including typical geometric, zoomorphic and anthropomorphic details, sometimes combined with vegetal elements of Mediterranean inspiration; in certain cases, entire narrative scenes are depicted (Vulpe–Gheorghiță 1976, 177–179; Conovici 1978, 175; Irimia 2006, 73). It has to be also noted that the ability to mass-produce locally these formerly scarce objects made them more accessible, their subsequent presence in non-elite related contexts outside the Carpathian range being archaeologically confirmed.

Lastly, the foreign craftsmen influenced some of the local ones as they introduced new technologies, practices and models. An example is the introduction of new dress ornaments of provincial Roman origin which were then being produced locally in some Dacian sites. One of the bronze workshops from Poiana in the Siret valley produced strongly profiled fibulae similar to those widespread in the neighbouring provinces and using a technology which was developed in Pannonia and Noricum (Rustoiu 2002, 79–81) (Pl. 4/1). Although some foreign craftsmen were responsible for the introduction of these objects in Dacia, their subsequent distribution and popularity were a consequence of the local networks of communication and exchange. Furthermore, a series of decorative details of Roman provincial origin have been taken over and added to some local garment accessories, for example certain zoomorphic elements (birds, wolves) of the strongly profiled fibulae were added to the spoon-shaped fibulae of local origin (Rustoiu 1997, 50, fig. 55/10, 12) (Pl. 4/2–5).

Some of those who created these hybrids may have been indigenous artisans. They also had to adapt to the customers' demands and in some cases they sought to imitate foreign desirable objects which were out of reach. Some local craftsmen could have been able to learn new technologies and models as apprentices working alongside foreign artisans, and this might have been the case of the aforementioned potters who were very probably trained in the mould-casting technique by specialists coming from the Greek-speaking world. However, in other situations the local craftsmen had no direct contact with foreign specialists so they had to rely on their own experience and skills to 'read' an object from the technological point of view. In many cases the local artisan was not able to identify the correct technological steps as they were part of the trade secrets, so he used his own knowledge to replicate as closely as possible the required object. One relevant example concerns the spoon-shaped fibulae from pre-Roman Dacia, which imitate the *Schüsselfibel* specific to the Alpine area and the region south of the Alps, as well as in Bohemia and Moravia (Rustoiu 1997, 46–50, with further bibliography) (Pl. 4/4–5). The latter fibulae were cast from bronze in one piece, whereas Dacian imitations, made of silver and later of bronze, were hammered in two separated pieces (the spring and the body) which were then soldered together to obtain the required shape. The resulting fibulae strongly resemble the originals and, given the popularity of the spoon-shaped fibulae, they must have been considered good enough. These technological adaptations, as well as the high level of acceptance among the local consumers, are relevant for the ways in which both the craftsmen and the customers 'read' and from the beginning acknowledged morphologically and functionally the originals.

In some particular situations the local craftsmen had to adapt to the demands of the foreign customers living close by. For the potters from Sarmizegetusa Regia this was apparently a less complicated task as they created hybrid tableware combining functional and decorative details of local and Mediterranean origin. For example, some particular forms (Pl. 2–3) combine the carinated or hemispherical shape of some Italic bowls with the tall hollow foot that is typical of the traditional Dacian 'fruit-bowls' (Florea 1993, 99, 108, fig. 1–3). These vessels also display other local features, like the fine grey fabric covered with a dark grey or brownish-black matte slip. The new serving/eating form must have met particular functional demands in a better or different way than the original vessels from which various elements were borrowed and combined. These features also reveal the persistence of some technological and morphological stereotypes related to the way in which the function of the object – the tableware in this

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case – was locally perceived. As already mentioned, the identity of some consumers is revealed by the frequent graffiti inscribed on these vessels, indicating that at least some of them were foreigners.

On the other hand, other local potters, for example those from Poiana, struggled to fulfil the demands of foreign customers who wanted oil lamps, which were significantly different from the local open lamps burning animal fat or tallow. The latter lighting devices, resembling a cup or a saucer and using a floating mesh, were hand- or wheel-made, almost always using a coarse fabric to increase their heat resistance. On the other hand, the Mediterranean lamps were cast from two or more parts, the aim being to obtain a closed container which securely retained the very fluid fuel. As the indigenous potters were not familiar with the lamp casting technology, they used ceramic techniques with which they were familiar to obtain a lamp which was ultimately able to function in a similar way even if the product was perhaps less stylish than the foreign forms (Pl. 5). Some of the resulting products attempted to reproduce both the morphological and the functional features of the original, whereas others were more focused on technological-functional aspects, the end-products departing morphologically from their prototypes. Furthermore, one might suspect that in certain cases the scarcity of very fluid fuels (i.e. olive or other vegetable oils) brought along a supplementary technological challenge. It has to be also noted that the local potters nearly always used a coarse fabric, again a technological stereotype, because this was the rule in the case of the local open lamps.

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It can be therefore concluded that in the eastern Carpathian Basin and the lower Danube region the demand for certain desirable goods which required particular skills and knowledge to produce, contributed significantly to the mobility of specialised craftsmen, and also to the spread of various manufacturing techniques across wider areas. Sometimes the artisans had the initiative, seeking new markets, resources and clients, but in many cases they were actively sought after and were even exchanged, sent over as gifts, or 'traded' (see also Rustoiu–Berecki 2014). In these situations, the specialists themselves and their expertise became desirable goods, which were incorporated into the local social, political and economic competition alongside other similarly perceived symbols of status.

At the same time, many archaeological contexts from the regions in question point to the fact that foreign craftsmen systematically maintained and displayed their ethnic and professional identity, setting them apart within the adoptive community. However, they regularly tended to adapt their trade to the local demands by incorporating relevant indigenous decorative or functional features. This practice frequently led to the appearance of many hybrid objects which must have been perceived by the consumers, and also by the producers, as more appropriate in the local environment, without loosing their distinctiveness.

The models, techniques and practices brought in by foreign artisans influenced some of the local craftsmen to a significant degree. This influence also led to the appearance of hybrid objects. At the same time, some of the indigenous craftsmen had to deal with the local demand for foreign objects which might have been technologically unfamiliar, and they managed to solve these problems by appealing to their own skills and knowledge. Still, both the foreign and the local artisans were rather conservative as to the technological aspects of their craft, very probably due to the way in which they learnt their skills, although they were also very adaptable to the demands of their clients. This interesting combination of conservatism and flexibility significantly contributed to the appearance of several hybrid products, together with customers' preferences.

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List of figures

Fig. 1. Distribution map of the imported metal vessels (after EGRI 2014a).

List of plates

Pl. 1. 1. Dacian fortress with a Greek plan at Costeşti-Blidaru (aerial photo Z. Czajlik); 2. Greek-style masonry from the fortress at Costeşti-Blidaru (photo M. Egri).

Pl. 2. 1. Distribution map of the relief-decorated hemispherical ceramic cups; 2–4. Locally produced relief-decorated hemispherical ceramic cups (after TURCU 1976; PREDA 1986); 5. Ceramic mould for relief-decorated hemispherical ceramic cups from Popeşti (after TURCU 1976).

Pl. 3. 1–3. Graffiti on hybrid ceramic vessels from Sarmizegetusa Regia (after FLOREA 2000 and 2001); 4–10. Cremation grave from Brad (after URSACHI 1995; 10. without scale).

Pl. 4. 1. Strongly profiled fibulae and half-finished products from Poiana; 2–3. Strongly profiled fibulae with zoomorphic decoration from Brad and Cândeşti; 4–5. Spoon-shaped fibulae with zoomorphic decoration from Ocniţa and Poiana (1–5. after RUSTOIU 1997).

Pl. 5. Local imitations of Mediterranean lamps. 1. Poiana (after VULPE–TEODOR 2003); 2–4. Popeşti (after GLODARIU 1976); 5. Sighişoara–*Wietenberg* (after ANDRIŢOIU–RUSTOIU 1997); 6. Borduşani–*Popină* (after SÎRBU–TROHANI 2001).

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Plate 1. 1. Dacian fortress with Greek planimetry at Costești-Blidaru (aerial photo: Z. Czajlik);
2. Greek-style masonry from the fortress at Costești-Blidaru (photo: M. Egri).

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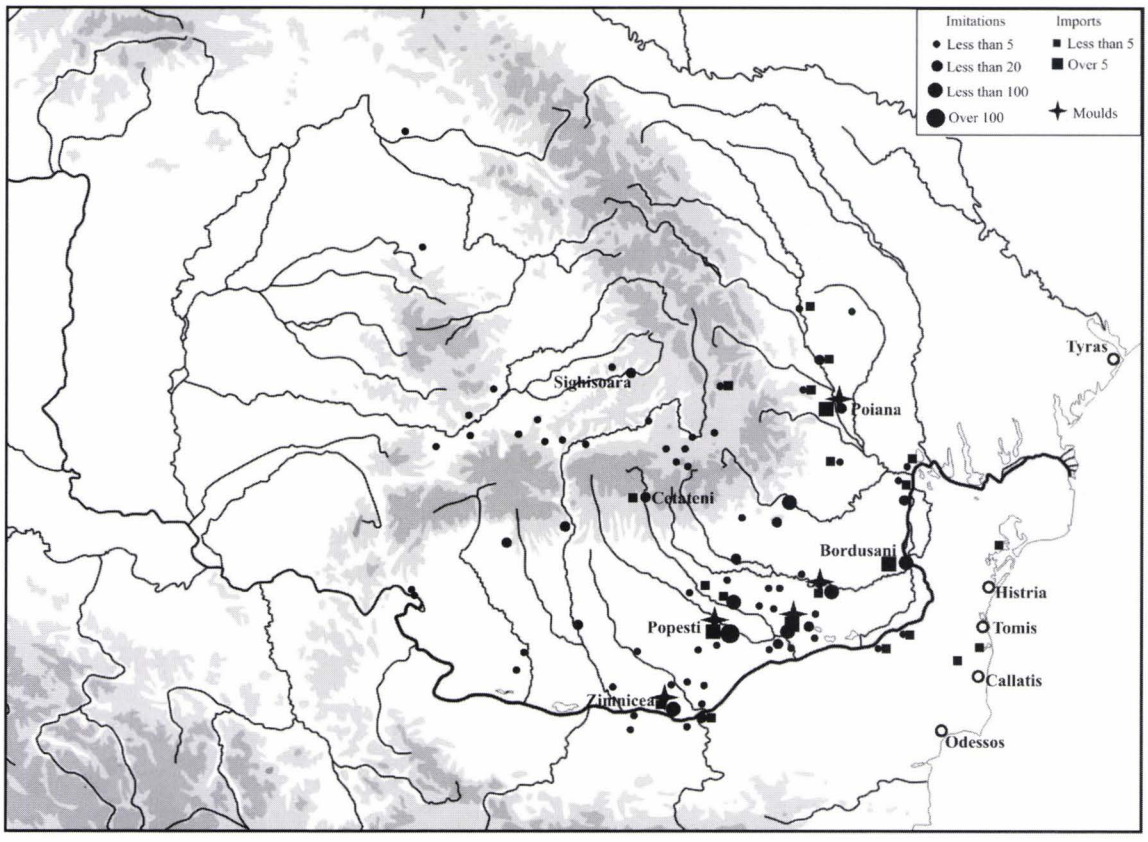

Plate 2. 1. Distribution map of the ceramic relief-decorated hemispherical cups;
2–4. Locally produced relief-decorated hemispherical cups (after Turcu 1976; Preda 1986);
5. Ceramic mould for relief-decorated hemispherical cups from Popeşti (after Turcu 1976).

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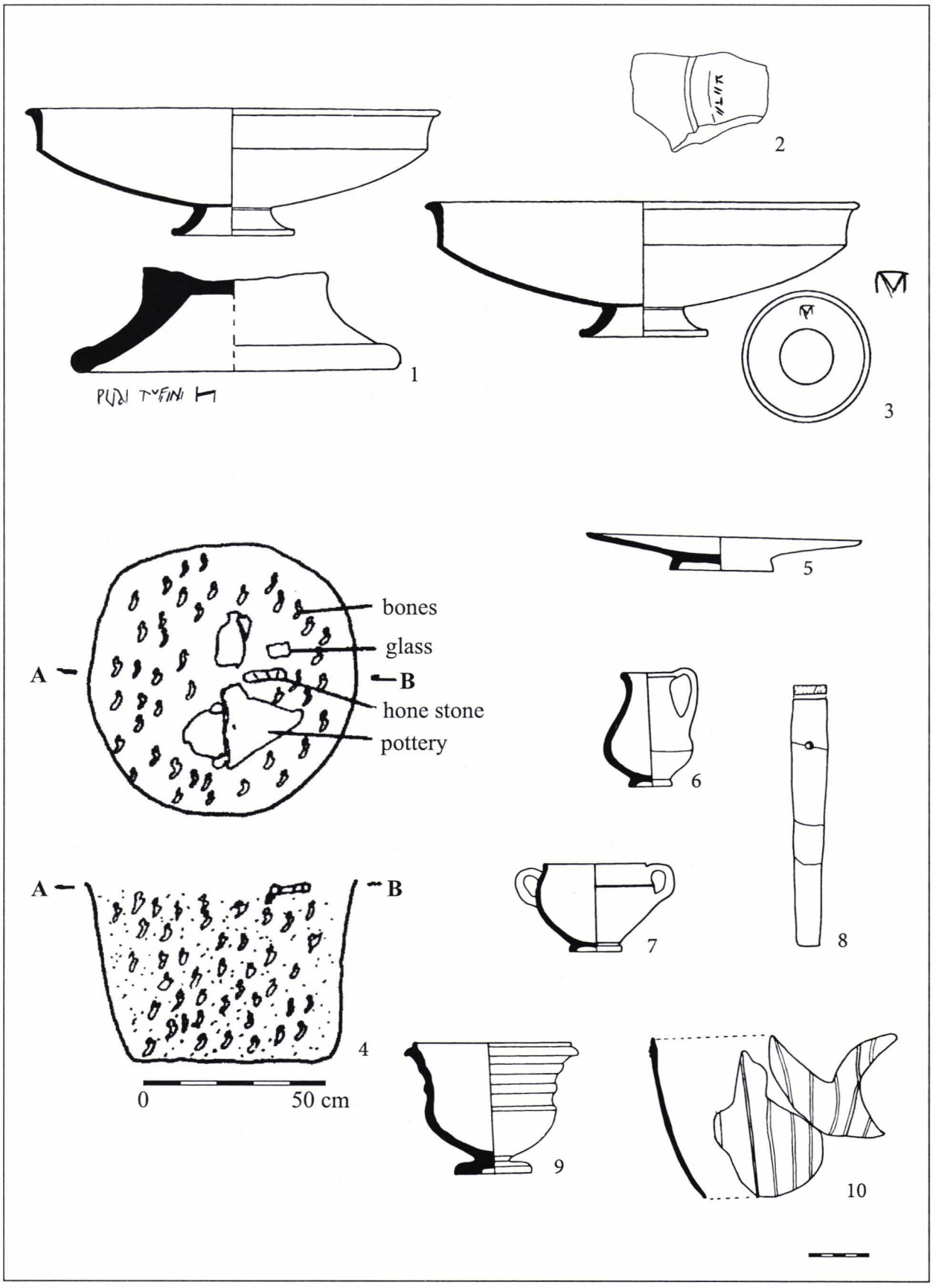

Plate 3. 1–3. Graffiti on hybrid ceramic vessels from Sarmizegetusa Regia (after Florea 2000 and 2001); 4–10. Cremation grave from Brad (after Ursachi 1995; 10. without scale).

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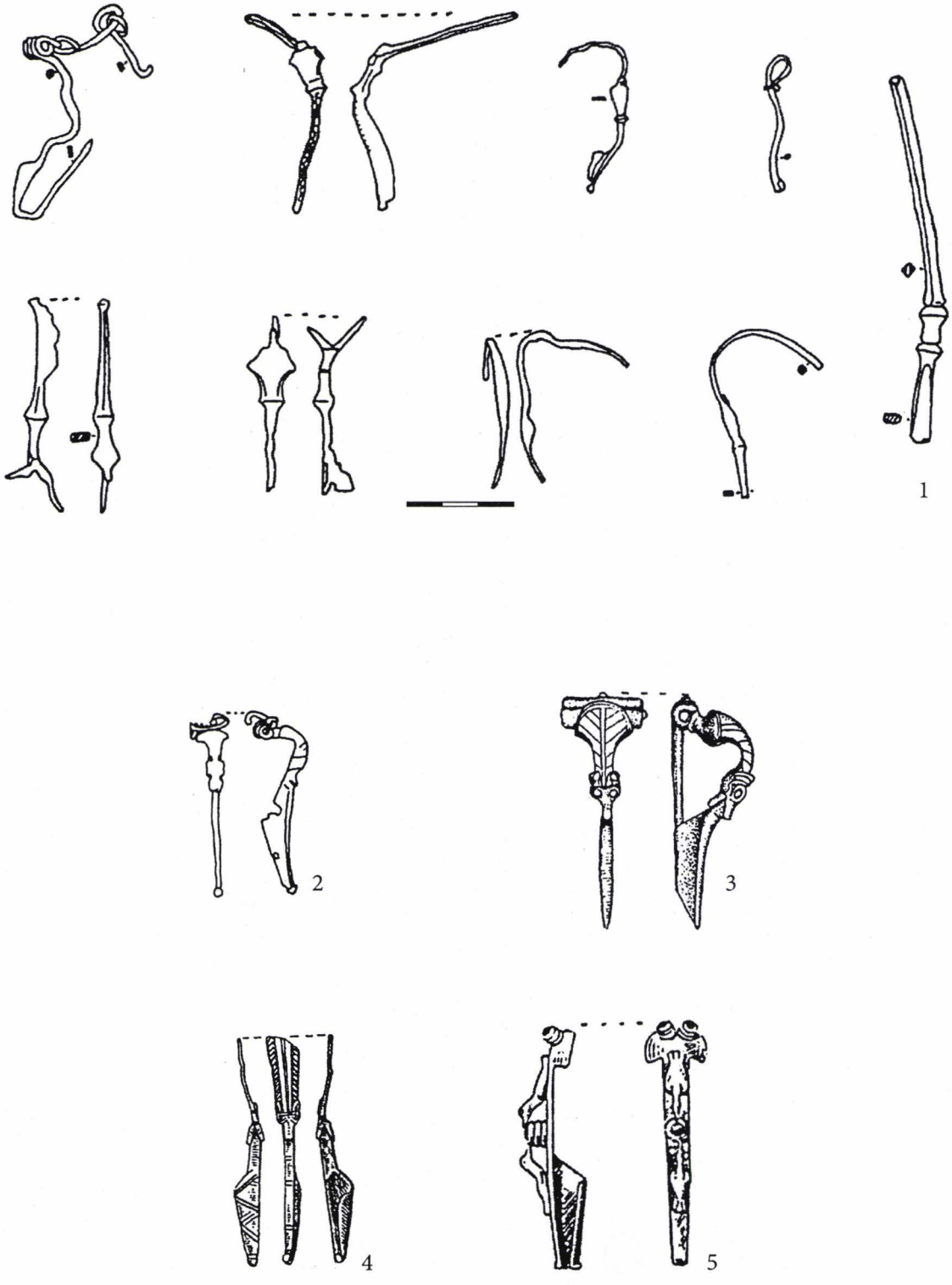

Plate 4. 1. Strongly profiled fibulae and half-finished products from Poiana;
2–3. Strongly profiled fibulae with zoomorphic decoration from Brad and Cândeşti;
4–5. Spoon fibulae with zoomorphic decoration from Ocniţa and Poiana (1–5. after Rustoiu 1997).

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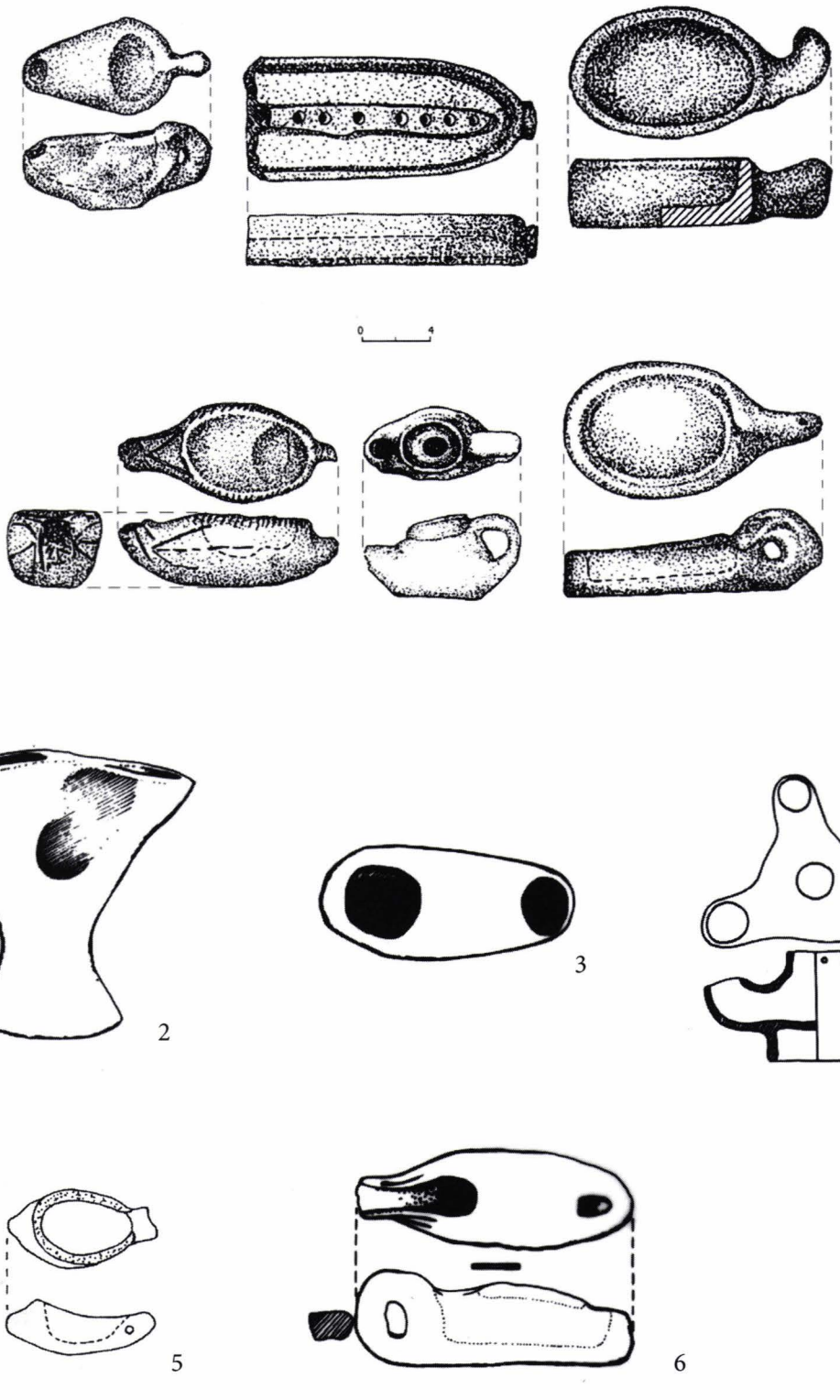

Plate 5. Local imitations of Mediterranean lamps.
1. Poiana (after Vulpe–Teodor 2003); 7–9. Popeşti (after Glodariu 1976); 10. Sighişoara–*Wietenberg* (after Andriţoiu–Rustoiu 1997); 11. Borduşani–*Popină* (after Sîrbu–Trohani 2001).

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Celtic Elites and Craftsmen: Mobility and Technological Transfer during the Late Iron Age in the Eastern and South-Eastern Carpathian Basin*

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In the second half of the fourth century and at the beginning of the third century BC large territories from the eastern and southern Carpathian Basin were colonized in successive phases by different Celtic groups. The Celtic colonization of the Carpathian Basin subsequently contributed to the appearance of some complex social networks incorporating different communities, and in which the elites of certain populations from the northern Balkans were also involved (see Rustoiu 2012 with previous bibliography).

These relationships established between different communities allowed the development of several cultural exchanges which are sometimes archaeologically visible, although many others cannot be directly seen in archaeological evidence. Amongst the latter are the so-called 'intellectual products' – practices, ideologies, technologies, beliefs, etc., which circulated from one community to another. Many artisans, especially jewellers, had an important role in these transfers of ideas and practices. Therefore, this article is going to discuss the role of Thracian, Illyrian and Mediterranean craftsmen in the dissemination of some models and technologies from the northern Balkans into the La Tène areas of the Carpathian Basin. At the same time, our analysis will take into consideration a series of problems regarding the concrete mechanisms through which various technologies and products circulated from one place to another. Amongst these mechanisms can be listed the relationship between the artisans and those who ordered the goods (the elites), and the temporal and spatial mobility of the specialists. Thus the article will focus on a series of relevant archaeological contexts and artefacts discovered in the eastern and south-eastern Carpathian Basin and in the northern Balkans.

Some questions of interpretation have to be taken into consideration when discussing the role of local or foreign craftsmen, regardless of their origin (Thracian, Illyrian, Macedonian or Greek). First, the new communities resulting from the cohabitation of the colonists with the local populations generated many hybrid cultural features and practices. One example is the appearance of some new costumes

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combining indigenous and La Tène elements. As a consequence, the craftsmen were compelled to know and use technologies that allowed them to produce elements incorporated into such hybrid costume assemblages and bodily ornaments.

Secondly, both the local and the foreign specialists were frequently connected with, or subordinated to, the communities' elites and leaders. The latter were the main customers for luxury goods and the same people who imposed fashion trends, symbolic meanings or functional characteristics of both the decorative and the utilitarian objects.

Thirdly, metal smiths, and in general the artisans, were highly mobile in time and space. The craftsmen used to hand down technologies and specific knowledge from one generation to another within their own families or craft-related groups. This practice may explain the perpetuation of some types of artefacts and specific techniques through time. At the same time, the spatial mobility of the craftsmen was commonly determined by the need to find new customers, who were interested in their trade, were able to pay and to provide the required raw materials, and were perhaps also able to offer protection in certain cases.

The craftsmen's mobility and their relation with elite customers are also mentioned in some literary texts, although the ancient authors were not necessarily the most impartial or reliable source of information. For example, Pliny the Elder (*Nat. Hist.* 12. 5), evoking an old Roman story regarding the Celtic invasion of Italy at the beginning of the fourth century BC, mentions the famous blacksmith Helico of the Helvetii, who worked for a while in Rome and then returned home, bringing dates, grapes, wine and olive oil which captured the taste and imagination of his trans-Alpine compatriots, making them to flock to Italy. Although Helico is more likely an imaginary character, the story itself attests the fact that the activity of foreign craftsmen in different cultural environments was common, especially during the lifetime of Pliny the Elder.

Another example illustrating the relations between craftsmen and elite customers can be found in a passage from Phylarchus, cited by Athenaeus (*Deipnosophistae* IV. 34). The Greek historian mentions that Ariamnes, 'an extremely rich Galatian' from Asia Minor, once announced that he intended to organize a huge feast for 400 participants at his own expense. Since the feast required an outstanding quantity of cooked meat, Ariamnes had to order a large number of iron cauldrons a year in advance, and had to also look to other 'cities', besides his own lands, for numerous skilled craftsmen able to make them.

Aside from these literary accounts, the craftsmen's mobility can be also noted sometimes in particular archaeological contexts. Thus the following discussion will take into consideration the archaeological evidence from the Carpathian Basin regarding these aspects.

The spatial mobility of the craftsmen. Archaeological evidence

Cremation grave no. 34 from Fântânele–*Dâmbu Popii*, dated to the LT B2 (Rustoiu 2008, 121–123, fig. 59; Rustoiu 2009, 10–11), presents evidence which argues for the mobility of the craftsmen (Pl. 1). The funerary inventory contains, aside from an iron hammer, a hand-made ceramic lamp (Fig. 1/1; Pl. 1/4). This artefact imitates the Greek prototype (Rustoiu–Egri 2010a; 2010b) of a wheel-thrown open lamp (Fig. 1/2–3). Lamps of this type were found in the Pontic area, both in the Greek cities and in indigenous settlements (Fig. 1/4) (Dupont 2005, 77, fig. 3j; Hannestad 2007, 142, fig. 4; Højte 2010, 436, no. O–105, pl. 326). However, apart from the lamp found in the burial from Fântânele, similar lamps or any other form resembling Mediterranean prototypes are absent from the Carpathian Basin during this period. The use of this kind of device required a certain degree of familiarisation with a particular form of artificial lighting, which could not be acquired within the local community, but in an area in which such objects were commonly used. Thus, the presence of this lamp in the grave alongside the iron hammer, a tool which was relevant for the role of the deceased within the local community, suggests that this slightly 'exotic' object was also perceived as an integral part of his identity. Due to these elements, it might be presumed that the craftsman who met his end in the Fântânele community either came from the outside of the Carpathians, more likely from the east of the mountains, or he was a local who worked there for a while.

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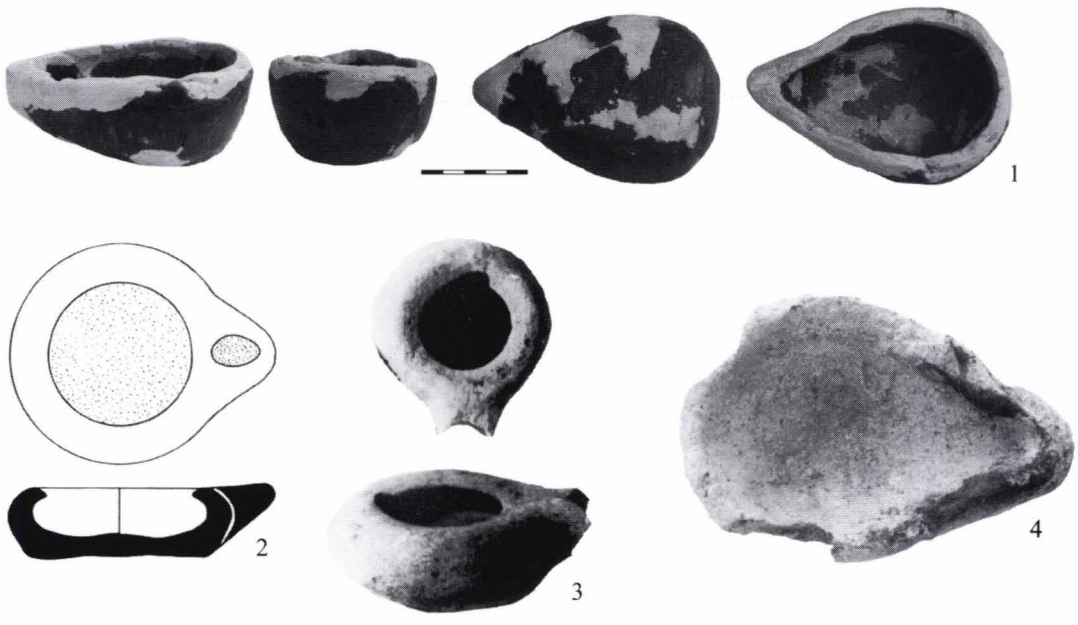

Fig. 1. 1. Lamp from the grave no. 34 at Fântânele–*Dâmbu Popii*; 2. Original Greek lamp from Stelnica (after Teleagă 2008); 3. Original Greek lamp from Seuthopolis (after Čičikova 1984); 4. Imitation of Greek lamp from Olbia (after Højte 2010).

Another example of spatial mobility, concerning a jeweller who came from the Pontic region to the inner Carpathian area in a later period, is provided by a discovery from eastern Transylvania. In this case, a ceramic mould for manufacturing amphora-shaped pendants (Fig. 2/1) was found in a house uncovered in the rural settlement at Angheluș, Covasna County (Székely 1976, 232–233, fig. 3/1; Crișan 2000, 20, no. 7B, 134, pl. 73/4, who erroneously mentions that the mould is made of stone). The inventory of the house also contains fragments of hand-made and wheel-thrown vessels, as well as a clay figurine (Fig. 2/2) (Székely 1976, 233, fig. 3/3; in the caption the author lists erroneously the find-spot as Poian, the latter being illustrated in fig. 3/2, see the correct identification in Crișan 2000, pl. 125/1). The context was initially dated to the third–second century BC, but the recent analysis of the pottery indicates that the house can be dated to the first century BC–first century AD (the artefacts have been analysed by S. Berecki in the Museum of Sf. Gheorghe; Crișan 2000, 20 also noted the presence of some ceramic fragments belonging to the same date).

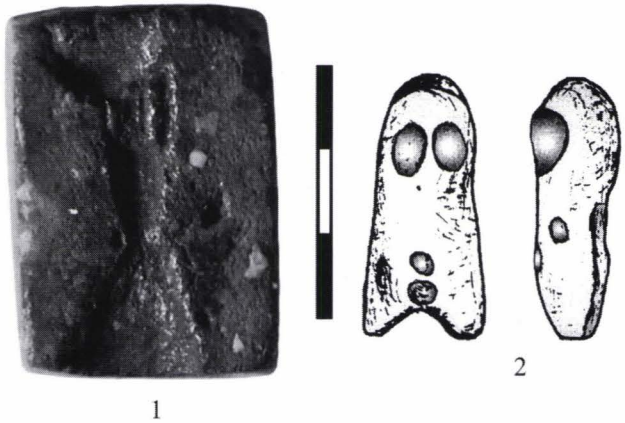

Fig. 2. Angheluș. 1. Ceramic mould used in the manufacturing of amphora-shaped pendants (photo: S.-J. Sztáncsuj); 2. Clay figurine (after Crișan 2000).

Other more-or-less similar moulds, made of sandstone, clay, or amphora fragments were found in some Greek Pontic cities, for example at Histria, Olbia and Phanagoreia (Coja 1962, 134–135, fig. 12/3b; Kołkówna 1978, 69–72, fig. 34–35, 46; Krutilov 2010, 474, no. Rb-6, pl. 357). These were dated to the Hellenistic period and the beginning of the Roman imperial times. The amphora-shaped pendants made of gold or silver, cast in moulds or modelled using other techniques, became popular in the middle and late Hellenistic period, being used as decorative elements of some necklaces and earrings (Higgins 1980, 163; Treister 2004, 459–460). Amongst these ornaments can be listed a pair of gold earrings discovered in the cemetery from Messambria, dated to the third century BC (Gălăbov 1955, 141, fig. 15; *L'OR* 2003, 204–205, no. 308f), an earring from the cemetery at Anchialo (Tonkova 1997, 92, pl. 6/1) and another from Kalymnos, dated to the second–first centuries BC (Higgins 1980, pl. 48/C), as well as the

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necklace from Olbia, dated to the same period (Treister 2004, fig. 5). The mould from Angheluș points to the presence of an artisan who had came in eastern Transylvania from a Pontic city in a period which follows the conquest of the western shores of the Black Sea by Burebista, and during which the Dacian Kingdom attracted many Greek craftsmen. Amongst the latter can be listed the architects and masons who contributed to the construction of several fortresses and other structures in the Orăștie Mountains using limestone blocks.

Furthermore, a series of discoveries from Moldavia points to some connections across the Carpathians related to metallurgical activities. For example, a small deposit containing 19 flattened iron bars (Teodor 1983 identified them as plough coulters; Babeș 1993a, 53 correctly identified the function of the iron bars from Moldavian deposits) was discovered at Oniceni, Neamț County (Pl. 2/1–4). Another deposit comes from Negri, Bacău County (Antonescu 1968) and contains 315 iron bars similar to those from Oniceni, as well as 22 sword blade-shaped bars and 16 elements of sword-chains of LT C1 type (*Panzergürtel* in German, *gourmettes* in French) (Pl. 2/5–9).[1] Such sword-chains are common in the Carpathian Basin, but are missing from the areas outside the mountains (Zirra 1974, 147–148, fig. 6/5–7; Popović 1994, 54, map 1; Hellebrandt 1999, pl. 11/11, 20/6, 58/1, 9, 66/1, 90/2, etc.). Recent investigations from Sajópetri in north-eastern Hungary have shown that this manufacturing centre also produced military equipment, including such sword-chains (Guillaumet 2007, 256). These deposits attest some connections between the areas both inside and outside the Carpathians. Some craftsmen (or perhaps merchants) from the La Tène cultural environment may have transported semi-finished products destined to some workshops from the outside of the Carpathians, pointing to a reversed direction of the artisan mobility, from the west to the east (Pl. 3/1).[2]

The spatial mobility of the fine metal-workers, as well as their connections with the elites, can be sometimes observed by analysing the distribution area of certain resources, the traces of manufacturing activities and the circulation of finished products. From this point of view, the situation observed within the Thracian communities from the north-eastern Balkans, in present-day Bulgaria, is relevant. In this region one can note the different geographic distribution of the gold and silver sources in comparison with that of the jewellery workshops (Pl. 4). The precious metal sources are concentrated along the Balkans range (Stara Planina) and the Rhodope Mountains (Pl. 4/1). On the other hand, a series of workshops are concentrated in north-eastern Bulgaria in some local urban centres like Sveshtari, or next to some aristocratic seats, in a region lacking the sources of precious metals (Pl. 4/2) (Tonkova 1994, 185–186, map 1–2; Tonkova 1999, 185–186, fig. 1–2). It can be therefore presumed that the aristocracy from these areas had access, in one way or another, to the sources of gold and silver from the mountains, providing in turn raw materials for the local workshops – run either by indigenous or Greek artisans – which produced luxury goods for them. These goods were part of their own particular manner of expressing higher social status and identity. As a consequence, the artisans were compelled to follow those who ordered such goods and were able to provide the necessary raw materials.

The spatial and temporal mobility of the craftsmen: Technological evidence

The temporal and spatial mobility of the metal smiths, as well as the relations between the artisans and the elites, can be also revealed by an analysis of certain categories of gold and silver artefacts. From this point of view, some jewellery discovered in Banat and the neighbouring areas are significant.

1 The deposit from Negri was never completely published and various researchers give different figures concerning the inventory. Thus Babeș 1993a, 53, lists 314 bars having the shape of a 'plough coulter' or 'spear head', as well as 27 long segments and 19 short segments belonging to some sword-chains.

2 Iron ingots or bars having different forms, some similar to those from Moldavia, are attested in several areas from Western to Central Europe. Although these items might have also been used as 'currency bars', they were mainly semi-finished products for blacksmiths. From this point of view, it is significant that in the oppidum from Manching iron bars were found having different shapes, illustrating the diversity of the metal supplying sources (Pleiner 2006, 23–37, with bibliography). In the eastern Carpathian Basin, iron bars having different shapes and dimensions were found in metallurgical centres dated to the LT B2–C1 from Sajópetri, in north-eastern Hungary (in which such bars were also produced: Guillaumet 2007, 258–259), and probably Mukačevo, in Transcarpathian Ukraine (Jankovich 1931, pl. 8/19). At the same time, iron bars having diverse forms, some resembling plough coulters, also come from the Celtic environment in south-western Slovakia, being discovered in deposits and also in settlements (Pieta 2010, 161, fig. 68, 103–104).

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The silver spiral earrings or hair-loops (Pl. 3/2; 5/2) discovered in the cemeteries from Aradu Nou in Banat, Belgrade–*Karaburma*, Kostolac–*Pecine* and Kostolac–*Repnjak* in Serbia, originate from similar jewellery specific to the end of the Early Iron Age in the north-western Balkans (Todorović 1972, 26–28, pl. 23; Jovanović 1994; 2007; Gavranović 2007, 413–414, fig. 11; Ljuština–Spasić 2012; Rustoiu–Ursuțiu 2013a, 326, fig. 13; Rustoiu–Ursuțiu 2013b, with previous bibliography). At the end of the fourth century BC, or LT B2a, such ornaments were integrated into garment assemblages of La Tène type (Pl. 5/1, 3–4). On one hand, this practice reflects a particular manner of expressing personal identity amongst the women belonging to some ethnically and culturally mixed communities in which some traditional garment accessories were preserved. On the other hand, the presence of these fine ornaments illustrates the perpetuation of some specific techniques of metalworking during several generations.

Other similar examples are provided by some silver jewellery resembling Mediterranean or Pontic prototypes, but made very probably in workshops in the Balkans. The inventory of cremation grave no. 1 from Remetea Mare contains, amongst other artefacts, four biconical silver beads made in the filigree technique (Pl. 6/2) and two saddle-shaped silver finger-rings (Pl. 6/3) (Medeleț *ms*; Rustoiu 2008, 111–115, fig. 55, 57/2). Although the anthropological analysis of the cremated human bones has not yet been carried out, the association of the panoply of arms with a set of female jewellery suggests a double burial. The funerary inventory dates the grave to the LT B2a (Pl. 7).

The filigree silver beads are not specific to the La Tène environment, but are common in the Mediterranean and the Balkans area (Pl. 6/1). Quite similar beads, made of gold, are known from grave no. 2 of the tumulus no. 2 from Seuthopolis, in which they are associated with two gold fibulae of the Pestrup type dated to the LT B2 (Pl. 8/4–5) and two silver fibulae of the 'Thracian' type (Dimitrov–Čičikova 1978 *apud* Anastassov 2011, 234, fig. 23; Domaradzki 1984, fig. 33). Ten other nearly similar silver beads come from a grave discovered at Zimnicea and dated to the second half of the fourth century BC (Alexandrescu 1980, 31, no. 50, fig. 50/9–12). Other filigree beads were also found in the Illyrian environment in the north-western Balkans. Some quite similar pieces are known from graves no. 41 and 44 from the Illyrian cemetery at Szentlőrinc, in southern Hungary, belonging to a pre-Celtic chronological horizon that corresponds to the LT A–B1 (Jerem 1968, 186, fig. 25/41–1, 26/44–2; pl. 40/1). At the same time, a few biconical filigree beads come from inhumation burials no. 1 and 2 from the tumulus no. 35 at Glasinac–*Gosinja planina*, in Bosnia-Herzegovina. Both burials were ascribed to the Glasinac Vb phase and can be dated to the second half of the fourth century and the beginning of the third century BC. More than that, grave no. 1 also contains early Dux fibulae (Benac–Čović 1957, 23, pl. 47/10, 16–18). Four filigree beads were recovered from Umčari near Belgrade, together with an assemblage of silver finds which includes silver belts of the Mramorac type, a fibula and two omega-shaped pins, all being dated to the fifth century BC (Garašanin 1960, 88, fig. 8). Lastly, another example consists of six beads incidentally discovered at Nikinci, on the Sava River (Vasić 2005, 68, 12–15).

In this context, the beads from Remetea Mare illustrate the integration of some jewellery made in a workshop from the Balkans into a La Tène garment assemblage. The hoard containing silver jewellery found at Kovin, in the southern Serbian Banat, and dated to the first half of the first century BC, also contains similar beads (Pl. 9/1–4), as well as saddle-shaped finger-rings (Pl. 9/10–11, 13) made in the filigree technique (Rašajski 1961, 23, no. 6, pl. 1/3; Tasić 1992, pl. 12/42). This assemblage again illustrates not only the perpetuation of some elements of bodily ornamentation, but also the transmission of specific techniques required in the manufacturing of these objects within some groups or families of craftsmen from the northern Balkans.

The perpetuation of certain techniques through time is also demonstrated in other contexts. Amongst them can be listed the minting of silver coins at the end of the third century and the beginning of the second century BC (LT C1) and the manufacturing of certain silver jewellery during the first century BC–first century AD in the Dacian Kingdom (Rustoiu 1996a, 49–53; Rustoiu 1996b).

The first silver coins imitating the tetradrachms of Philip II appeared in the Celtic area of Transylvania around the middle of the third century BC[3] (Preda 1973, 49–50, 55–110; Preda 1998, 139, 142–159; for

3 Preda (1973) entitled his monograph dedicated to the pre-Roman coinage in Dacia *Monedele geto-dacilor* (*The coins of the Geto-Dacians*), so during the last decades the large majority of the Romanian specialists ascribed all of the Late Iron Age monetary issues from the inner Carpathian region to this artificial ethnic entity 'created' by modern historians (one exception is Zirra 1971, 217–219). However, during the last two decades some studies pointed to the fact that the coins

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a synthesis of all opinions regarding the beginning of the local coinage imitating the Macedonian tetradrachms see Mihăilescu-Bârliba 2003, 263). The hoard from Vişea, Cluj County, belongs to the first phase of the local coinage and contains a series of suberate coins (Chirilă–Chifor 1979, 68–69). The metallographic analysis indicates that they were minted by forging a thin sheet of top quality silver over a copper core (Stoicovici 1975). Later, at the end of the second century and during the first century BC, the same technique was used to produce silver jewellery having the core made of low quality metal covered by a thin sheet of top quality silver (Pl. 8/1). Some hoards containing such jewellery – fibulae, necklaces, bracelets, pin-shaped pendants, etc. – were found in the same regions in which earlier dated hoards containing similarly made coins were found, in northern Transylvania and Crişana, and also in other regions of pre-Roman Dacia, indicating a wider spread of this technique (Rustoiu 1996a, 49–53; Rustoiu 1996b; Toma 2013). Nevertheless, the presence inside the Carpathian range of this kind of artefacts during an extended chronological period indicates the perpetuation of the necessary technological knowledge within certain families or groups of craftsmen.

The connection between the craftsmen who minted these coins and those who made jewellery and garment accessories is further argued by the inventory of a jeweller workshop uncovered in the settlement at Pecica, near Arad (Crişan 1978, 84–98). This workshop functioned at the end of the first century BC and during the first century AD, or perhaps only in the first half of this century (Rustoiu 1996a, 56). Its inventory includes the specific tools of a jeweller (moulds for ingots and for making horse-bit shanks and rings, crucibles, anvils and a set of small chisels), as well as finished or recycled products. Together with them was found a coin die which was rendered unusable by chiselling the active end, so it was no longer usable at the time when the workshop functioned. This tool was formerly used to mint local *scyphate* coins specific to the second century BC (Crişan 1978, 88–89, 94–95). The preservation of this die amongst other useful tools from the workshop's inventory by several generations of craftsmen also points to the practice of maintaining certain specific knowledge and technologies within the same specialised family or group. The die also raises the question of what were the means through which the various crafts and their related knowledge were transferred from one generation to another.

Learning, magic and metallurgy

The perpetuation of knowledge from one generation to another in these illiterate societies was closely connected to oral transmission and the education of the young. One may reasonably infer that within different categories of crafts many boys had taken over the activity of their fathers and learned the skills through apprenticeship within their own families. However, the organization of learning seems to be more complex. In an analysis concerning Iron Age education, which takes into consideration a series of ancient literary sources and the Irish and Welsh literary and juridical texts, R. Karl notes that learning was ruled by well-defined contractual and juridical principles. In many cases the practice of adoption played an important role in education. More precisely, aside from the so-called 'caring adoption' (which is encountered within a clan or family in the case of an orphaned child who is adopted by relatives), there was also the 'educational adoption' in which the youngsters were temporarily given up by their own parents to some skilled specialists to be educated. This system was mainly used for the education of noble offspring, who had to be familiarized with different activities according to their future role defined by family origin, social rank and aspirations, for example to become warriors, masters of the sacred, healers, poets, artisans, etc. According to the Irish traditions, this kind of adoption lasted from the age of four to that of fourteen in the case of girls, and from the age of seven to that of seventeen in the case of boys. This long period must have created strong emotional and affective connections between these children and their adoptive parents. This kind of educational system also contributed to the creation, maintenance and enforcement of various connections, agreements and alliances between different communities, and at the same time facilitated the appearance of many spatial and temporal networks of distribution and communications through which a wide variety of practices and ideas (economic, technical, social, religious, etc.) circulated across territories and from one generation to another (Karl 2005).

belonging to the first phase of the 'Geto-Dacian' coinage in Transylvania were found in areas in which numerous 'Celtic' settlements and cemeteries dated to the LT B2–C1 are attested. As a consequence, this coinage was ascribed to the Celtic horizon from the inner Carpathian region, as it was previously done by K. Pink (1939) towards the end of the interwar period: see Babeş 2001, 511, 515, and mostly Dietrich–Dietrich 2006, 32–35, with a comprehensive discussion.

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Within families or groups of metallurgists, skills were learned not only through practice, but also using oral transmission and memorising of different technological traditions and manufacturing 'recipes'. Similar modalities of education were also attested in other occupations. For example Caesar (*B.G.* VI. 14), mentioning the druids, writes that the youngsters either chose themselves this occupation, or were selected by their families, but they were compelled to memorise a large number of verses, so in some cases their training lasted up to 20 years.

In the case of metallurgists, the magical dimension of their craft played an important role in the preservation and transmission of knowledge. The transformation of matter through an apparently mysterious transition from one state to another was something akin to the interference between the world of humans and that of the immortals, so it was accompanied by numerous ritual and magic precautions. M. Eliade, in his analysis of the myths and legends related to the extraction of ore and metallurgy, noted that mines were frequently regarded as the matrix of the Mother Earth. Thus, the ores were considered to be slowly growing 'embryos' and their extraction was akin to a pre-term operation. For that reason the miners frequently performed purification rituals consisting of fasting, meditation, prayers and various cult practices. All these rituals were imposed by the very nature of ore extraction, which touched a sacred space and disturbed the subterranean rhythms and the spirits that governed over them.

From the ritual point of view, the most difficult operation begins when the ore is processed in kilns. In this process the craftsman takes the place of nature to accelerate and accomplish the 'growth', the kilns serving as new artificial matrices in which the ore's gestation is completed. Due to these concepts, this technological phase required several precautions and rituals, and the establishing of different taboos.

The metallurgist was also perceived as a 'master of fire', because he was able to obtain a matter which could not be found in nature. As a consequence, in archaic societies both the smelters and the smiths were known as 'masters of fire' similar to the shamans, healers and magicians. In this context the metallurgical craft must have had intimate connections with some occult practices and the arts of singing, dancing and poetry. Thus, the metallurgical 'recipes', having a magical character, were preserved and handed down from one generation to another through the use of particular practices of memorizing and communication, contributing to the sacred, mystery atmosphere surrounding the activity of the artisan. This activity was marked by initiations, specific rituals and secrets to which the uninitiated had no access. Therefore, the artisan was also perceived as a magician who had knowledge – 'the one who *makes* efficient things is the one who *knows* the secret to make them' (see further Eliade 1996; 1997, 429–432; for the relation between metallurgy, magic and ritual from an archaeological perspective see also Rustoiu 2002; Stöllner 2007, 243–244).

Due to the magical nature of metal processing, the artisans were nearly always also considered to be wizards. Eliade noted that from this perception came the ambivalent attitude towards this category of craftsmen, who were both despised and venerated. This attitude might have also influenced in some cases the workshops' location within the settlements. Sometimes these workshops occupy central areas, for example at Sboryanovo in the fourth–third centuries BC (Stoyanov–Mihaylova 1996, 56–57), or at Pecica in the first century AD (Crişan 1978, fig. 14, 18). In other cases, the manufacturing areas are well delimited within the settlements or are located at the periphery of the living areas, for example at Sajópetri (Szabó 2007, map 2).[4]

The house of the jeweller from Angheluş, mentioned above, seems to argue for the connection between the artisans and the magical practices. Its inventory contains a clay figurine (Fig. 2/2) which

4 Echoes of the magical attributes of the prehistoric blacksmith and his workshop sometimes reach modern times, as it happens, for example, in the novel *Morometii* written by Marin Preda, a famous Romanian author of the 20th century. He describes, in a colorful story inspired by his own childhood memories, the life of a family and of an entire rural community from the south of the Carpathians during the interwar period. The local blacksmith's workshop plays an important role in the social life of the community, being located near the crossroad and serving as a meeting point for the village's men on each Sunday. More than that, Iocan the blacksmith, who is a Gipsy, displays unusual somatic features, similar to the blacksmith-god Hephaestus or other shaman-gods from various mythologies. It is quite obvious that the author was inspired by some lectures on the history of religion, very probably also by the work of Eliade, but the story also preserves certain aspects related to the importance, role and attributes of the blacksmiths in the old Romanian communities. The location of the workshop (near the crossroad), the blacksmith himself (being ethnically different, thus representing the 'foreigner' or the 'other') and his physical appearance ('he was an ugly man – having an unusually thick, hanging lower lip'), and the meeting of the men on a day having a particular ritual significance (on Sundays), symbolically points to the magical nature of the blacksmith and to his status and image within the community.

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was commonly used in such practices (for the use of such figurines in magical rituals during the fifth century BC–third century AD in the region between the Carpathians and the Balkans and in the north-western Pontic region, see Sîrbu 1993, 58–62, 64–70, 110–122, fig. 37–52; Sîrbu 2006, 68–71).

The tool kit of the artisan was invested with magical properties and powers, and the instruments were inaccessible to the ordinary people. This perception may explain the preservation through time of some obsolete or damaged tools in the inventory of some workshops or in tool sets. One example could be the aforementioned coin die found in the workshop from Pecica, Arad County, which was rendered unusable by chiselling the active end after it ceased to be used for minting coins. Its destruction might be also interpreted as a desecration of the tool.

Other similar examples are known from pre-Roman Dacia. Some bronze punching tools displaying a female head on their active end (Pl. 10/2–3) have been found in the jeweller workshop from Radovanu (Morintz–Şerbănescu 1985, 22) and in the settlement from Bucureşti–*Cătelu Nou* (Leahu 1965, 61, fig. 38/6; Turcu 1979, 103, pl. 36/2), both being dated to the end of the second century and the first century BC. Another similar punching tool was found in a tower-house from the Dacian fortress at Costeşti, Hunedoara County (Pl. 10/4), which functioned between the middle of the first century BC and the beginning of the second century AD (Gheorghiu 2004).[5] These instruments were used to decorate some silver vessels or jewellery made of gold and silver sheet during the fifth–third centuries BC. For example, the famous hoard of vessels from Rogozen, in Bulgaria, contains a series of silver *phialae* decorated with the help of such punching tools (Babeş 1993b; Tonkova 1994, 180–182; Rustoiu 1996a, 63–64; Rustoiu 2002, 41; Kull–Stîngă 1997; Treister 2001, 75–81; Antonov–Torbov 2002). At the same time, similar instruments showing human heads, acorns, heads of real or fantastic animals carved on the active ends are also known from other contexts dated to the fifth–third centuries BC in the lower Danube basin and in the Pontic region, which corresponds precisely to the areas in which vessels and jewellery decorated with these motifs were also produced (Pl. 10/1; see also another distribution map in Kull–Stîngă 1997, 579, fig. 14). The punching tools discovered in pre-Roman Dacia and coming from nearly two centuries later dated contexts illustrate again the lengthy preservation of some tools perceived as having magical properties in the inventories of some workshops. The human figures carved on these punching tools further contributed to the symbolic and magical meaning of the instruments. The artefacts from Dacia are not exceptional, for example one punching tool displaying the image of a griffin, which was used in the fourth century BC and then preserved during a few more centuries, was found in a workshop from Pella in Macedonia (Treister 2001, 79–81).

Summarising the above-mentioned observations, the transmission of specific knowledge and skills from one generation of artisans to another was facilitated by a complex process of education through apprenticeship. Due to the magical nature of the profession of the metal specialist, the learning process required the novices to get through successive phases of initiation, which made them to memorise technological recipes and secrets. This modality of preserving and transmitting knowledge and technologies characterised the 'temporal mobility' of the artisans.

Northern Balkans artisans and technological transfers in the Carpathian Basin

The integration of some jewellery and garment accessories of Greek or northern Balkans origin into a series of garment assemblages of La Tène type points to the interest of some of the Celtic elites from

5 The punching tool from Costeşti displays wear marks on the active end, indicating a lengthy use. The metallographic analysis revealed the presence of small percentages of gold and silver in the bronze alloy, which led G. Gheorghiu to conclude that the tool was made of copper coming from the Apuseni Mountains, where the ore also contains traces of gold and silver. According to her conclusion, the tool could have been made and used in pre-Roman Dacia during the late La Tène phase. Recently, complex metallographic analyses of some similar punching tools from north-western Bulgaria, dated to the fourth–third centuries BC, revealed that some of them have compositions that resemble the one of the piece from Costeşti. More than that, it has been noted that these instruments were commonly made of recycled metals, which hampers the eventual identification of the primary source of raw materials. However, the authors of this study conclude that the analysed punching tools were made in workshops from north-western Bulgaria (Iliev *et al.* 2007). In this case, it may be presumed that the piece from Costeşti was more likely made in the fourth–third centuries BC in a workshop from the northern Balkans or the lower Danube region and it was preserved in the tool set of a family of artisans for a longer period, similarly to the punching tools from Bucureşti–*Cătelu Nou* and Radovanu.

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the Carpathian Basin in this kind of goods. Although the artisans coming from the Greek, Thracian or Illyrian environment used their own familiar technologies to produce jewellery of Mediterranean or northern Balkans inspiration for the Celtic elites, they were compelled to modify them according to the visual codes and the practical and symbolic needs of the customers. Perhaps the best known example is the hoard containing gold objects discovered at Szárazd-Regöly, in Hungary, which is more likely dated to the third century BC (Fig. 3).[6] M. Szabó has noted on many occasions that the hoard contains both objects having morphological and technological antecedents in the northern Balkans as early as the fifth–third centuries BC (filigree tubular elements or some types of beads), and pieces manufactured according to the norms and taste of the Continental Celts, like the wheel-shaped elements or the beads decorated with human heads (Pl. 8/2) (Szabó 1975, 152–155, fig. 7, pl. 7–10; Szabó 1991, 127, fig. 1–2; Szabó 2006, 114–115, fig. 20; etc.). Such gold or silver jewellery made in the filigree or granulation technique had an important role in the spread of this decorative style in the Carpathian Basin (Szabó 1975; for the influence of Thracian jewellery on the Celtic one, see Tonkova 2006). However, the artisans from the Celtic environment adapted this decorative style to their own technique of bronze casting, inventing the pseudo-filigree or pseudo-granulation, so only the visual element was transferred, but not the related technology (for the influence of the Celtic technological knowledge on the design of certain artefacts see Jope 1996, 399–401).

Fig. 3. The gold hoard from Szárazd-Regöly (after Szabó 1999).

Another example of the relation between the Greek or Thracian craftsmen and the warlike elites of the Carpathian Basin, and also of the complementary technological transfer, this time as regards military equipment,

6 Diverse opinions were expressed regarding the chronology of this hoard, the dating varying between the third and the first century BC (second half of the third century–second century BC: Szabó 1992, 169; first century BC: Megaw–Megaw 2001, 166–167; etc.). This variability is caused by the insufficient information regarding the context of discovery and the hoard's composition. The assemblage was found in the second half of the nineteenth century between Szárazd and Regöly, being recovered from a peat bog; the artefacts entered into the National Hungarian Museum in two groups in 1891 and 1892 (Hadaczek 1907). According to the observations provided by M. Wosinsky, then Director of the Museum of Szekszárd, several lots of artefacts (made of gold, amber and glass) were recovered from this peat bog, being separately grouped (Szabó 1999, 111). His observations indicate that there were several votive offerings placed in a sacred space (perhaps an ancient bog), probably over a period of time. The metal artefacts include a group of gold objects and another of silver. The latter group includes five middle La Tène type fibulae having large knobs on the foot and the spring consisting of a large number of spires, as well as one rectangular filigree plate decorated with human figures. Four segments of a loop-in-loop chain, having anthropomorphic pendants made of silver sheet on their ends (one is still preserved), hangs of the plate (two of them still have one filigree cylindrical socket attached) (Szabó 1999, 116, fig. 64–65). These fibulae, known as the Szárazd-Regöly type, are morphologically related to those of the Jarak-type from the area of the Scordisci, which chronologically belong to the Belgrade 3 horizon (Božič 1981, 328; Guštin 1984, 326–327), more precisely to the LT D1 sub-phase (Božič 2008, 146). According to the chronologies used in other areas by different specialists, this sub-phase covers the interval between the middle or the last quarter of the second century and the first quarter or the first half of the first century BC. The fibulae with knobs from the Dacian hoards, which also resemble morphologically the brooches from Szárazd-Regöly, belong to the same chronological interval (Rustoiu 1997). As concerns the remaining silver artefacts (the filigree plate with chains, sockets and anthropomorphic pendants), they have analogies in the hoard discovered in the settlement at Židovar, which was buried before the middle of the first century BC (Jevtić *et al.* 2006; for the anthropomorphic pendants see also the similar pieces from Hrtkovci: Dautova Ruševljan–Jevtić 2006). Thus, the silver items from Szárazd-Regöly belong to a hoard which can be dated to the LT D1, being similar to the deposits from the Scordiscian territory (in which gold objects are missing), and these features indicate its belonging to this cultural phenomenon. The gold artefacts belong to a distinct hoard or deposit. Their dating to the third century is suggested by the analogies from the northern Balkans cited by Szabó on numerous occasions. It can be therefore presumed that the bog located between Szárazd and Regöly was a sacred place in which two distinct hoards were placed at different times.

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is the appearance of sword-chains of the loop-in-loop type, usually made of iron, but sometimes also of bronze (see the comprehensive discussion in Rustoiu 2008, 105–116). These chains already appeared in the LT B2 in Western Europe and also in the Carpathian Basin (Pl. 11/1; for the evolution of sword-chains see Rapin 1987; 1991; 1995; etc.; for the distribution of sword-chains of the loop-in-loop type see also Bujna 1995, 260–262, fig. 4; Schönfelder 1998, fig. 5; Rustoiu 2006, fig. 10; Rustoiu 2008, fig. 51; Rustoiu 2012, fig. 7). M. Schönfelder (1998, 79–83) has noted that from the technological point of view they are variants of some jewellery chains made of gold or silver, which were widespread in the Mediterranean area during a long period of time. Morphologically, the chains from Western Europe have a ladder-like shape and their thickness decreases from one end to another (Pl. 11/2). Some of the examples from the Carpathian Basin are made from plaited loops and their thickness is completely even from one end to another (Pl. 11/3). The different features of the sword-chains from Western Europe, in comparison with those from the Carpathian Basin, suggest different means and ways through which some specific Mediterranean techniques were adopted.

One bronze chain discovered at Ensérune (see for instance Ginoux 2007, 148, no. 28, pl. 28), in southern Gaul (Pl. 12/1), as well as the finds from Monte Bibele in northern Italy (Schönfelder 1998; Lejars 2008, 137, 214) (Pl. 12/2), indicates that the technique of manufacturing was taken over from the western Mediterranean by craftsmen who worked in an environment related to the Greek or Etruscan workshops from the mentioned area. These craftsmen adapted a type of chain that was commonly used in jewellery to some specific needs of the warriors from north-eastern Gaul.

The situation in the Carpathian Basin is different. In this case the chains more closely resemble the jewellery prototypes made of gold or silver. This fact suggests a stronger affinity with the Mediterranean or northern Balkans workshops which used gold and silver, and also bronze. The presence of some bronze examples mainly in the southern Carpathian Basin seems to support this hypothesis. Such pieces were found in the cemetery from Belgrade–*Karaburma* (Pl. 12/3) (grave no. 66: Todorović 1972, pl. 24/4) and in grave no. 4 from Remetea Mare (Pl. 8/3B). Three other iron chains from the graves no. 1, 9 and 10 are morphologically similar (Pl. 8/3A; 12/4) (Medeleț *ms.*; Rustoiu 2008, 111, fig. 55–56, 57/1. The Greek or indigenous workshops (inspired by the Greek ones) from the neighbouring Balkans areas, which produced jewellery and garment accessories in the fifth–third centuries BC, very probably contributed to the genesis of the sword-chains specific to the Carpathian Basin.

Thus, the sword-chains of the loop-in-loop type very probably appeared in both Western and Eastern Europe through the adaptation of some jewellery elements from the Mediterranean area to the particular needs of military equipment. In both geographic areas the transfer had been performed by a number of craftsmen who were familiar with the Greek jewellery technique. The mobility of both the warriors and the craftsmen further contributed to the spread of these pieces of military equipment across wider areas. Nevertheless, this hypothesis does not exclude the possibility that some sword-chains from the Carpathian Basin may have circulated from the west to the east. Rapin (1995) has noted the presence of some specific types of sword-chains both in the west and the east, although those from the eastern regions never reached Gaul, whereas the western ones were sometimes attested in the Carpathian Basin.

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The colonization of the eastern and southern parts of the Carpathian Basin led, amongst other things, to the creation of certain complex connections between the Celtic elites and those of the populations from the northern Balkans and eastern Mediterranean, in spite of the major structural differences in the social organization of the respective communities.

In the fourth–third centuries BC the Celts from the Carpathian Basin evolved, similarly to most of those from the temperate Europe, within rural societies which were apparently egalitarian or pseudo-egalitarian (see Schönfelder 2007). However, individuals, families and communities were engaged in a permanent social and economic competition, which led to an increased power and influence of the elite, who chose to express personal and group identity in a manner specific to the La Tène environment. The interment of warriors together with their panoply of arms which

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served as a symbol of their belonging to a privileged social category is a relevant example (see WELLS 2007).

On the other hand, in the northern Balkans the local society was dominated by an aristocracy that was clearly separated functionally and visually from the ordinary members of the communities. This is visible in funerary contexts and also in the manner in which the aristocracy expressed its social status using rich and ostentatious elements. Thus the aristocratic burials consist of spectacular monuments having mortuary chambers, covered by large tumuli, in which rituals of heroization were periodically performed. Their inventories included garment accessories and jewellery made of gold and silver (some having an important symbolic significance, like the diadems and seal-rings), military parade equipment also made of precious metals (greaves, helmets, horse harnesses etc), Greek or local metal vessels, etc. (KULL 1997; ARCHIBALD 1998; SÎRBU–FLOREA 2000; MĂNDESCU 2010, 377–418; etc.). Unlike the rich aristocracy of the northern Balkans, ordinary members of the local communities were buried in flat cremation cemeteries (inhumation burials being rare), and the funerary inventories consisted of ceramic vessels and bronze or iron jewellery and garment accessories (which were rarely made of precious metals) (SÎRBU 1993, 41–42; SÎRBU 2006, 117–128; MĂNDESCU 2010).

The social contacts and networks established between the elites from the Carpathian Basin and the northern Balkans aristocracy determined the circulation of certain objects and also of some archaeologically invisible 'intellectual products' from one area to another (for these aspects see VENCLOVÁ 2002, 74–75; STÖLLNER 2010, 283–286, fig. 5). However, the differences in social structure and organization, and in ideology and identity construct, determined the appearance of some hybrid forms, adapted to the visual, practical and symbolic needs of each party. This hybridization can be observed, for example, in the construction of certain costumes or in the bodily ornamentation which combine La Tène elements with others of Greek or northern Balkans origin.

The artisans' mobility played an essential role in the transfer and perpetuation of different technologies required for the manufacturing of these hybrid elements. This mobility was both temporal, through the complex educative and learning processes which allowed the transmission of specific knowledge from one generation to another within artisan families or groups, and spatial, through the movement of craftsmen looking for customers able to provide protection, resources and demand. From this perspective, the relation between the specialised craftsmen and the customers who required objects manufactured according to their own functional, visual and symbolic norms, is relevant for understanding the technological transfers or the ways in which 'foreign' objects were 'read' and 'copied' using local specific techniques (see also EGRI 2014, in this volume).

The term 'itinerant craftsman', commonly used to define the artisans' mobility, should be understood as defining the temporary movement of the specialist from one customer to another, and not as a permanent or institutionalized way of life. From this point of view the workshops are always fixed, immobile and functioning in the proximity of the clients, who might have been particular individuals or the entire community (ZACCAGNINI 1983, 258–259; RUSTOIU 1996a, 53).

The artisans' mobility embraced different forms. One of them is the so-called 'commercial' mobility – a voluntary movement of the craftsmen looking for clients in the way identified as early as the first half of the first millennium BC in Greece and the Levant, or within some communities from the Near East after the disintegration of the Bronze Age societies (ZACCAGNINI 1983, 257–264), and perhaps also in the Iron Age temperate Europe.

At the same time, the artisans' mobility might have been caused by 'reciprocative' actions in which some skilled specialists were part of the gift exchanges between different masters, when the former were in a relation of dependency with the latter (ZACCAGNINI 1983, 249–256). This kind of mobility appears within highly hierarchized societies dominated by an authoritarian aristocracy, probably like those of the Odrysians, Triballi or Getae, who were based on a social-political economy of prestige. For example Thucydides (II. 97. 3–4), describing the Odrysians, and the Thracians in general, mentions that nothing can be done with them unless gifts are brought, and not only for the king but also for the court aristocracy. Xenophon (*Anabasis* VII, 3) also writes that, during a banquet at the court of Seuthes III, the Odrysian king received gifts from different people, consisting of a white horse, a young slave, clothes for his wife, a silver cup and a carpet, all being redistributed afterwards (see also the comments

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in Mauss 1921).Within this kind of society the mobility of certain artisans might have been governed by these practices.[7]

The craftsmen's mobility was also closely connected to the elite's mobility, mostly in the societies of the temperate Europe during the fourth–third centuries BC. The movement of larger or smaller heterogeneous groups across Europe also incorporated, alongside the warriors and their families, a series of specialised craftsmen. This phenomenon may explain, to a certain extent, the widespread distribution of the Hatvan-Boldog swords from Western Europe to Transylvania, in both directions (see Ginoux *et al.* 2014, in this volume), as well as that of the swords having the scabbards decorated with pairs of face-to-face griffins or dragons, or of particular types of jewellery and metal ornaments. Their widespread distribution was not determined exclusively by the wider circulation of different users (groups and individuals), but also by the activity of the artisans who accompanied the travelling elites and produced these artefacts in the newly colonised areas.

Lastly, the relation between the artisans and the elite customers, the spatial and temporal mobility of the specialists, as well as the technological transfers, can be also identified through archaeological analyses, as it has been shown above. Furthermore, the adoption of certain techniques of Mediterranean origin or the transformation of some foreign objects through the use of local techniques might be more accurately identified using some other forms of detailed analyses in the case of certain types of finds from the Carpathian Basin. However, these approaches must remain subjects for future research.

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7 One example of the manner in which such kind of 'redistribution' of some skilled artisans functioned among the elites is provided by a letter of Pliny the Younger written in AD 112, in which he describes the peregrinations of a certain Callidromus (*Epistulae* 74, 1–3). This Callidromus was a house slave of M. Laberius Maximus, the governor of Moesia Inferior during the first Dacian war of Trajan in AD 101–102. During the Sarmatian and Dacian invasion in Moesia Inferior (probably in present-day Dobrogea) in the winter of AD 101–102, Callidromus was captured by Susagus, a Sarmatian leader, and was sent to Decebalus. The Dacian king, who probably wanted to conclude an alliance with the Parthians against the Romans, sent an embassy to Pacorus, which also brought the slave Callidromus as a gift among other things. The slave managed to escape, probably after the death of Pacorus in AD 110, reaching the province of Bithynia (where Pliny the Younger was governor), and 'lending his skill' to the bakers Maximus and Dionysius. Due to the poor treatment suffered at the hand of the two bakers, Callidromus requested asylum from the authorities, to whom he told his story. After the enquiry Pliny sent him to Trajan, probably for the information about the Parthians that the slave might have known, as the emperor was preparing his eastern campaign. The letter of Pliny the Younger illustrates the manner in which one specialised individual may become a 'gift' exchanged between two rulers. The fact that Callidromus worked in a bakery may suggest that he was specialised in this kind of activity. Decebalus perhaps considered that his skills were good enough to send him as a gift to the Parthian king. Otherwise, his inclusion amongst the diplomatic gifts could not be justified, as the Dacian king aimed to get Pacorus as an ally (for the comments regarding the letter of Pliny the Younger see Tudor 1956; for the veracity of Callidromus' story see Bradley 1994, 23–24).

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List of figures

Fig.1. 1. Lamp from grave no. 34 at Fântânele–*Dâmbu Popii*; 2. Original Greek lamp from Stelnica (after Teleagă 2008); 3. Original Greek lamp from Seuthopolis (after Čičikova 1984); 4. Imitation of Greek lamp from Olbia (after Højte2010).

Fig. 2. Angheluş. 1. Ceramic mould used in the manufacturing of amphora-shaped pendants (photo S.-J. Sztáncsuj); 2. Clay figurine (after Crişan 2000).

Fig. 3. The gold hoard from Szárazd-Regöly (after Szabó 1999).

List of plates

Pl. 1. Fântânele–*Dâmbu Popii*, grave no. 34. 1–3. Iron objects, 3–8. Ceramic objects.

Pl. 2. 1–4. Iron bars from Oniceni (after Teodor 1983); 5–9. Iron bars and sword-chains from Negri (after Babeş 1993a, without scale).

Pl. 3. 1. Graves containing metallurgical tools (black squares), metallurgical centres and workshops (black triangles), deposits of iron bars (black dots); 2. Distribution of the annular spiral jewellery (earrings and bracelets).

Pl. 4. 1. Distribution map of the ancient gold and silver sources in Thrace; 2. Distribution map of the jewellery workshops and tools from the fifth–third centuries BC in Thrace (after Tonkova 1999).

Pl. 5. Graves with spiral earrings. 1. Kostolac–*Repnjak* (after Jacanović 1987, without scale); 2. Donja Dolina (after Gavranović 2007); 3. Belgrade–*Karaburma*, grave no. 63; 4. Belgrade–*Karaburma* grave no. 67 (3–4. after Todorović 1972).

Pl. 6. 1. Distribution map of the biconical filigree silver beads; 2–3. Remetea Mare, grave no. 1. 2. Filigree silver beads; 3. Saddle-shaped silver finger-rings (after Medeleţ *ms*; Rustoiu 2008).

Pl. 7. Inventory of the grave no. 1 from Remetea Mare (after Medeleţ *ms*; Rustoiu 2008).

Pl. 8. 1. Microscopic images of a silver bracelet from the hoard found at Drăgeşti, Bihor County, having a low quality core and a top quality silver cover (after Toma 2013); 2. Detail of a gold pendant with a human head from Szárazd-Regöly (after Szabó 1999); 3. Remetea Mare. A. Iron chain from grave no. 1; B. Bronze chain from grave no. 4 (after Medeleţ *ms*; Rustoiu 2008); 4. Gold necklace and Pestrup-type fibulae from female grave no. 2/tumulus no. 2 at Seuthopolis (photo K. Giorgiev).

Pl. 9. The silver hoard from Kovin, Museum of Vršac (photo F. Medeleţ).

Pl. 10. 1. Distribution map of the punching tools from the northern Balkans; 2–4. Punching tools discovered in workshops or contexts dated to the first c. BC. 2. Bucureşti–*Cătelu Nou* (after Leahu 1965); 3. Radovanu (after Morintz–Şerbănescu 1985, without scale); 4.Costeşti (after Gheorghiu 2004).

Pl. 11. 1. Distribution map of the loop-in-loop sword-chains; 2. Iron sword-chain from St. Benoît-sur-Seine (after Ginoux 2007); 3. Bronze sword-chain from Belgrade–*Karaburma* (after Todorović 1972).

Pl. 12. 1; 3. Graves containing bronze sword-chains; 2; 4. Graves with iron sword-chains. 1. Grave no. 163 from Ensérune (after Ginoux 2007); 2. Grave no. 120 from Monte Bibele (after Schönfelder 1998); 3. Grave no. 66 from Belgrade–*Karaburma* (after Todorović 1972); 4. Grave no. 9 from Remetea Mare (after Medeleţ *ms*; Rustoiu 2008).

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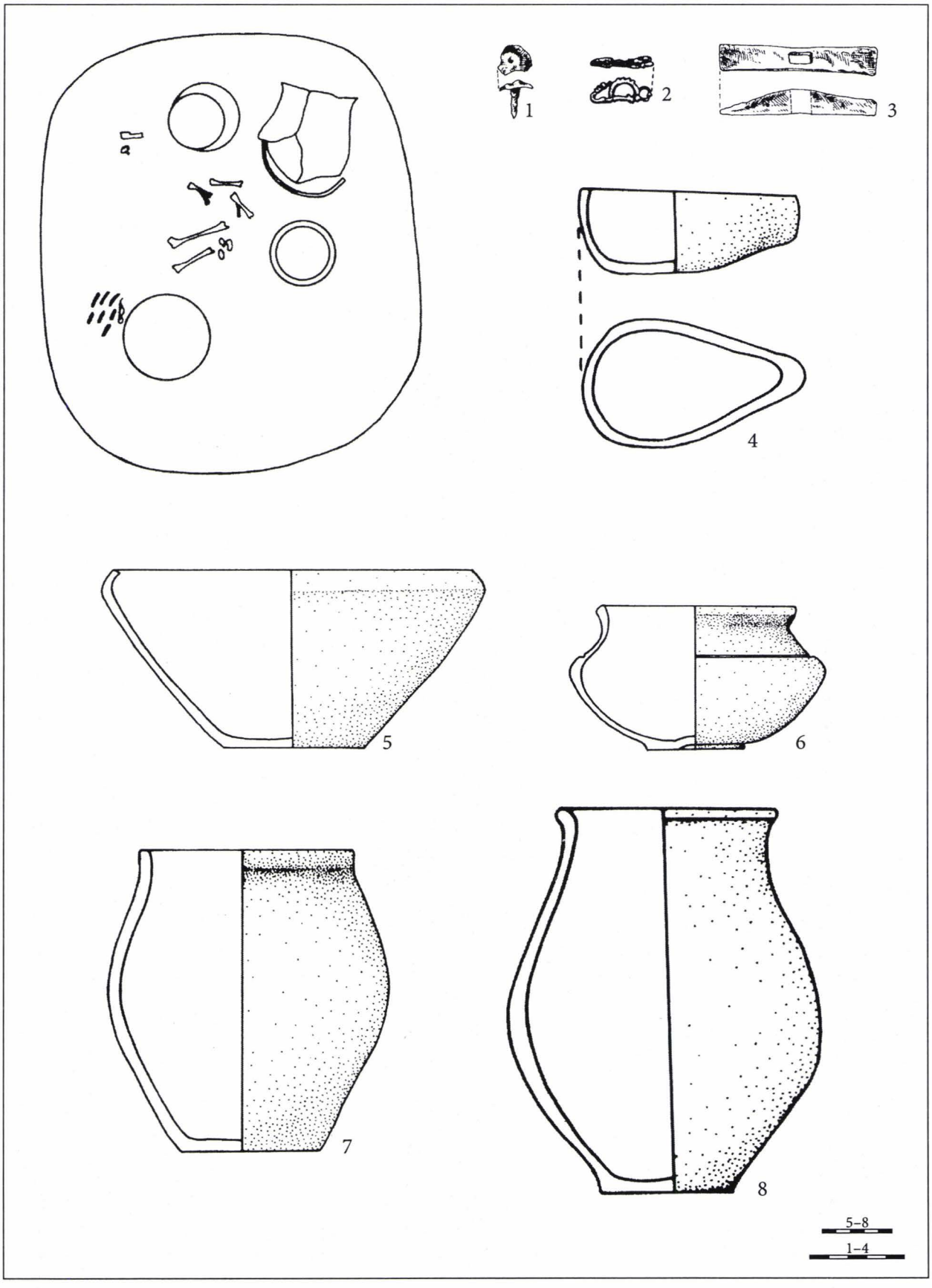

Plate 1. Fântânele–*Dâmbu Popii*, grave no. 34. 1–3. Iron objects, 3–8. Ceramic objects.

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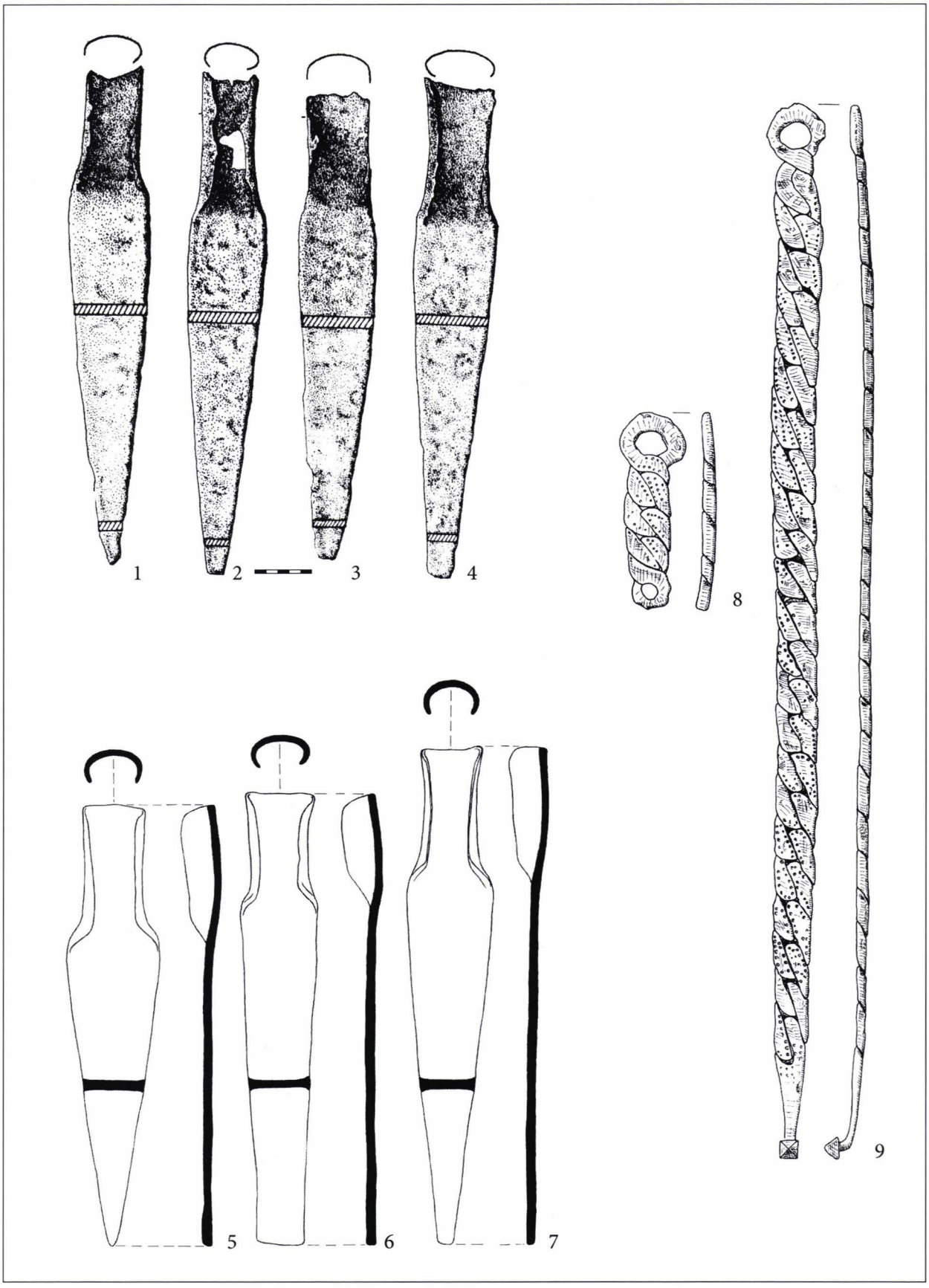

Plate 2. 1–4. Iron bars from Oniceni (after Teodor 1983);
5–9. Iron bars and sword-chains from Negri (after Babeş 1993a, without scale).

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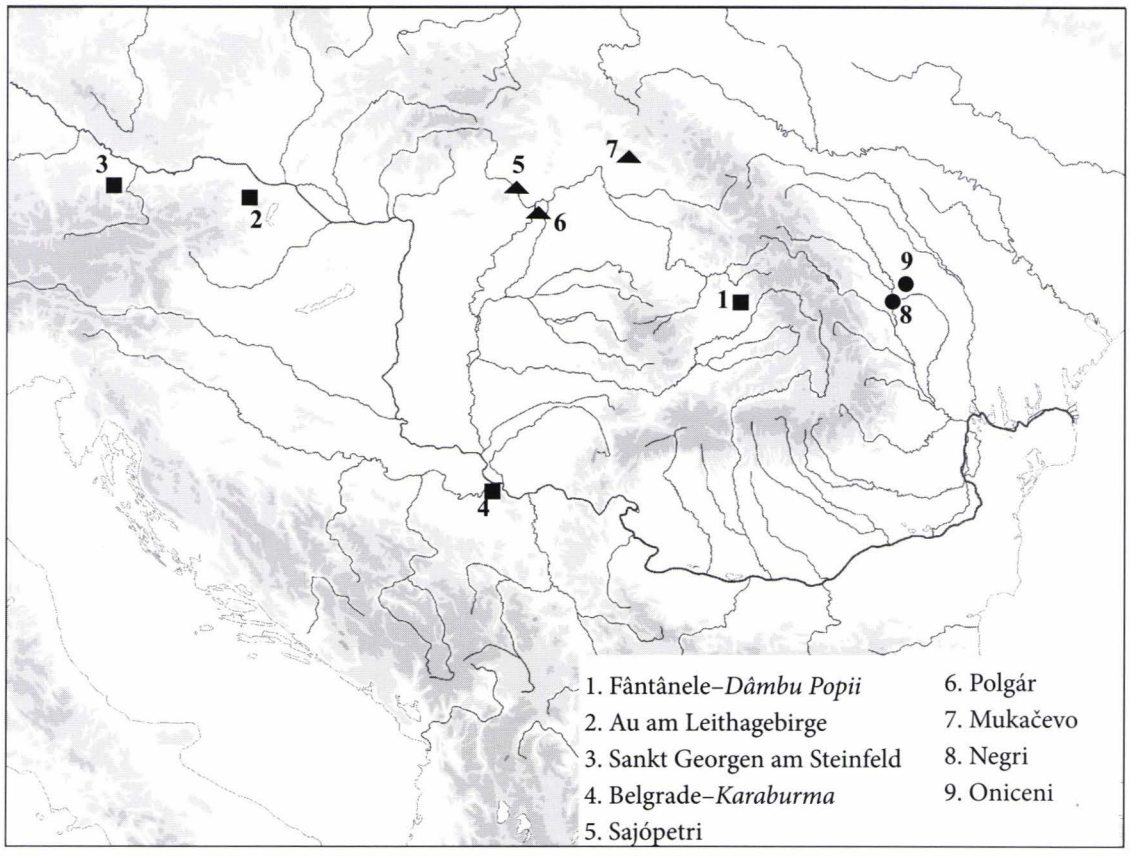

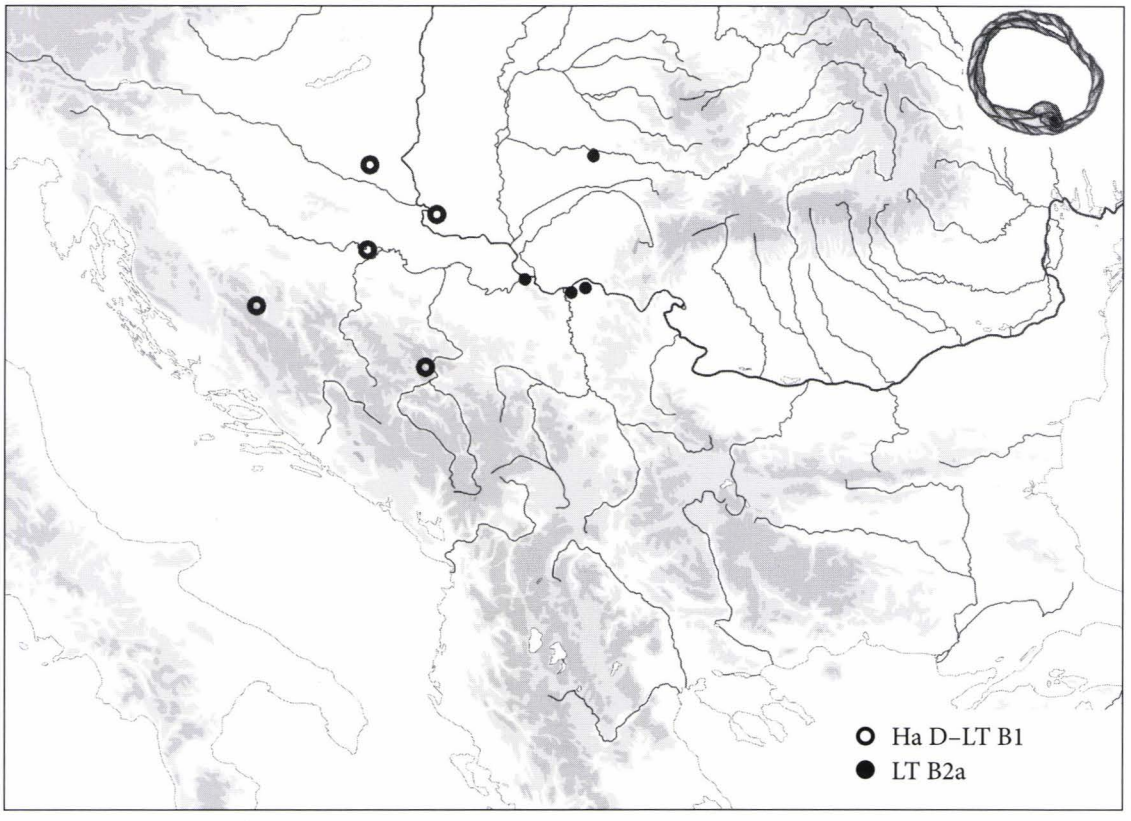

Plate 3. 1. Graves containing metallurgical tools (black squares), metallurgical centres and workshops (black triangles), deposits of iron bars (black dots); 2. Distribution of the annular spiral jewellery (earrings and bracelets).

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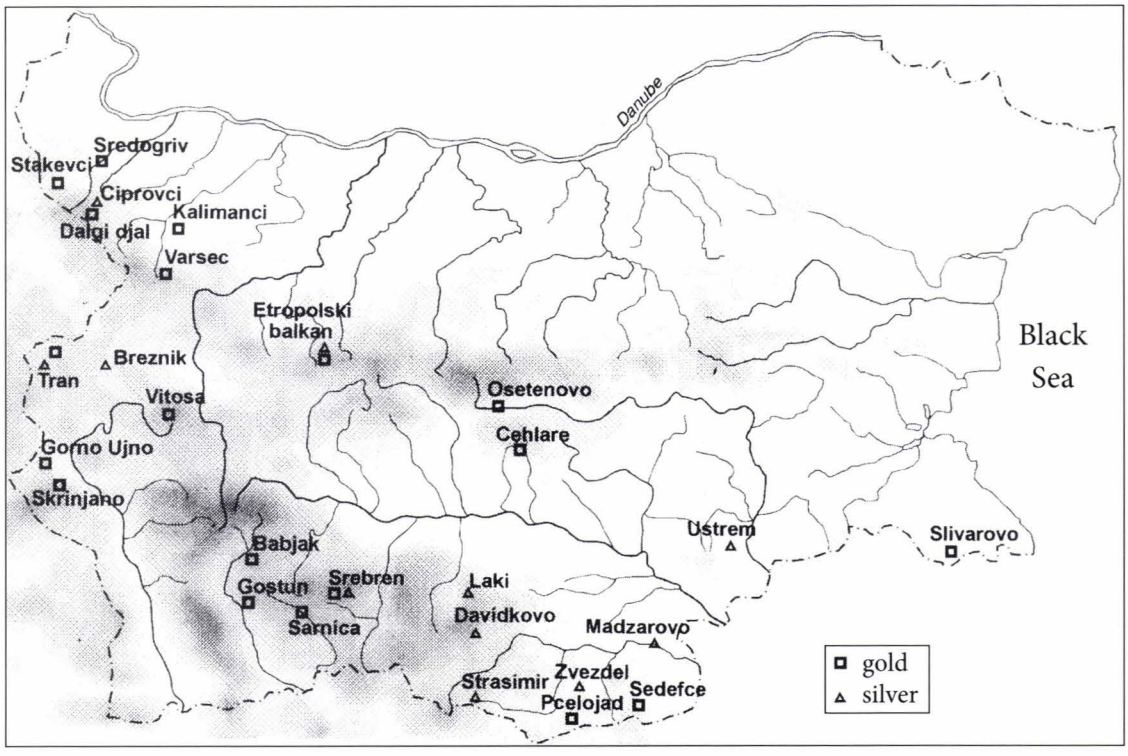

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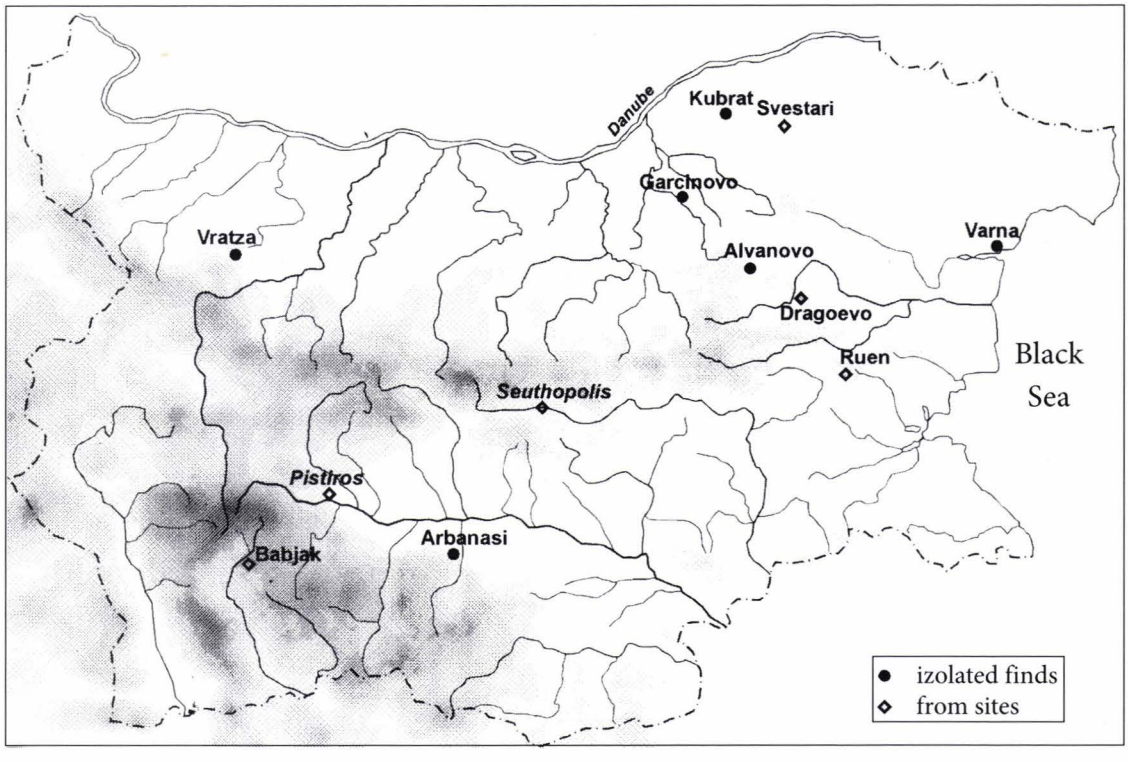

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Plate 4. 1. Distribution map of the ancient gold and silver sources in Thrace; 2. Distribution map of the jeweller workshops and tools from the fifth–third centuries BC in Thrace (after Tonkova 1999).

https://biblioteca-digitala.ro / http://muzeulmures.ro

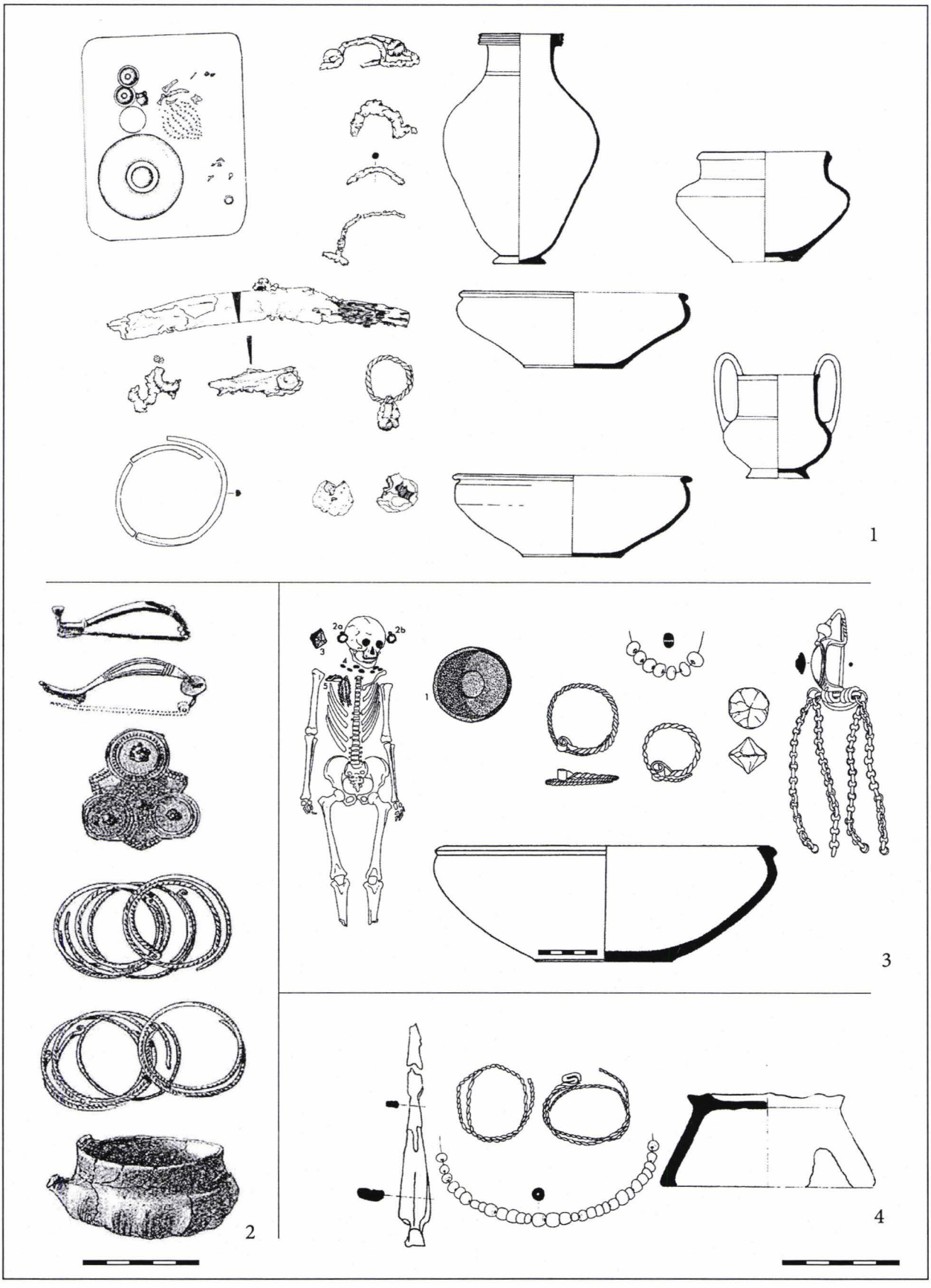

Plate 5. Graves with spiral earrings. 1. Kostolac–*Repnjak* (after Jacanović 1987, without scale); 2. Donja Dolina (after Gavranović 2007); 3. Belgrade–*Karaburma*, grave no. 63; 4. Belgrade–*Karaburma* grave no. 67 (3–4. after Todorović 1972).

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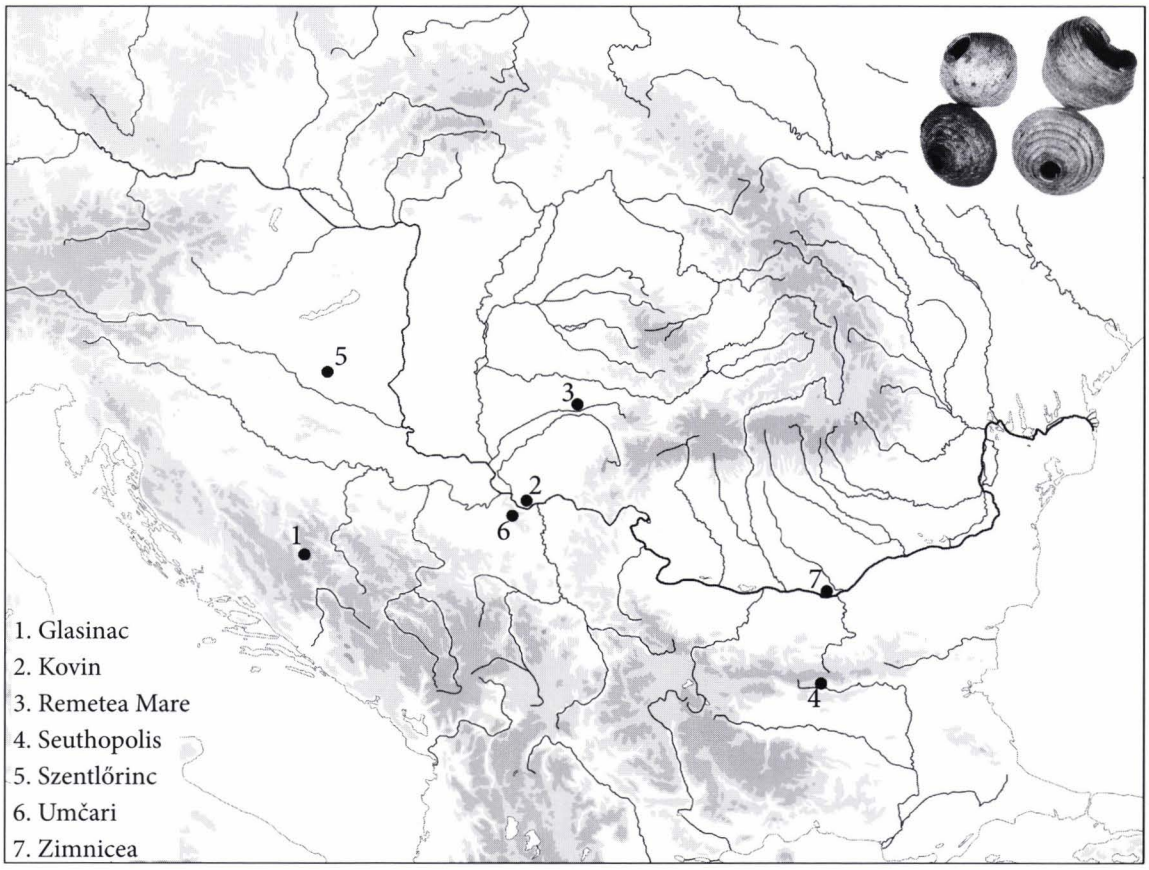

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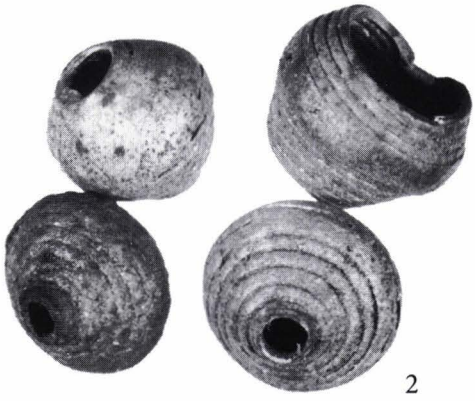

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Plate 6. 1. Distribution map of the biconical filigree silver beads; 2–3. Remetea Mare, grave no. 1. 2. Filigree silver beads; 3. Saddle-shaped silver finger-rings (after Medeleț *ms*; Rustoiu 2008).

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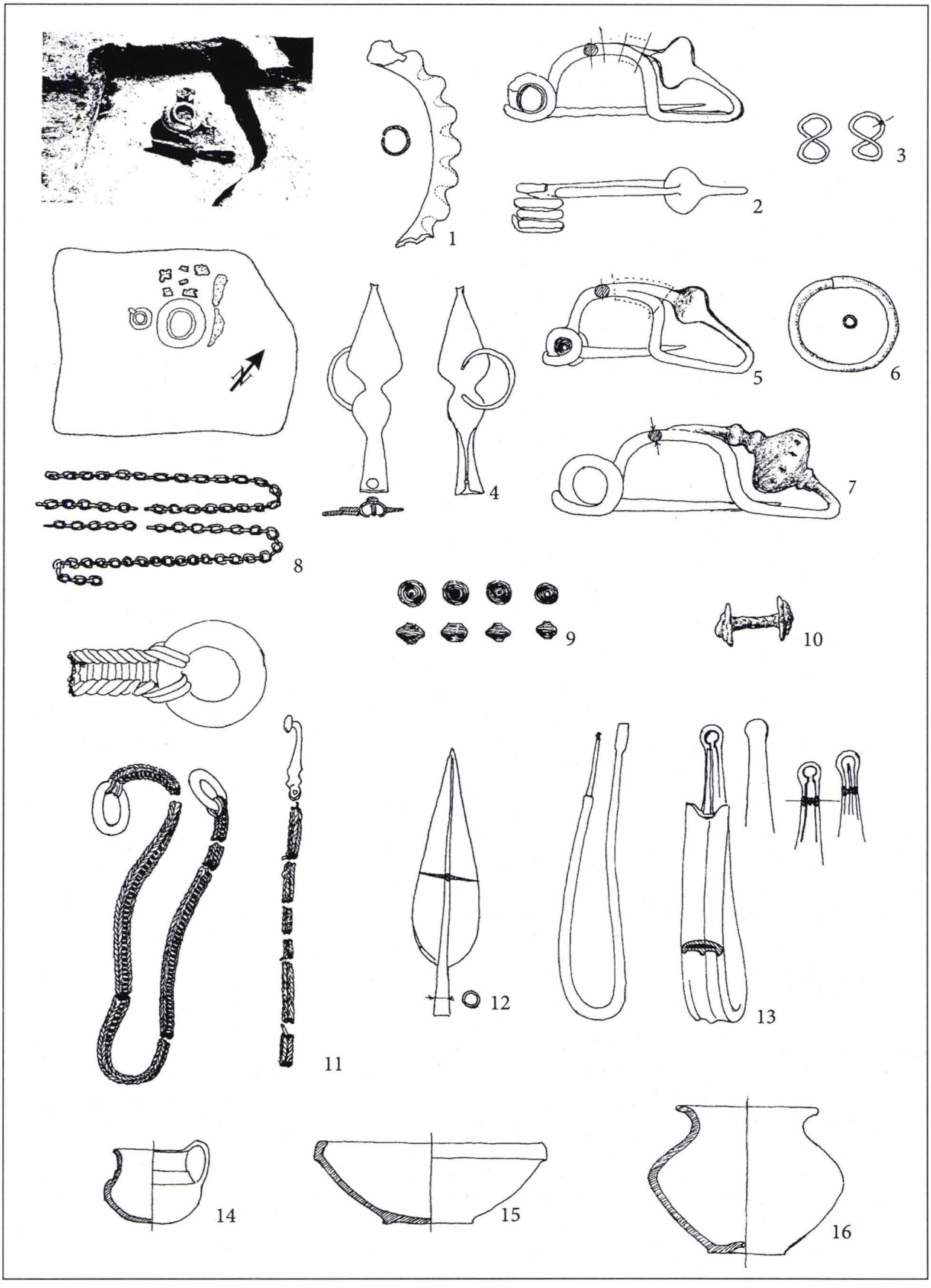

Plate 7. Inventory of the grave no. 1 from Remetea Mare (after Medeleț *ms*; Rustoiu 2008, different scales).

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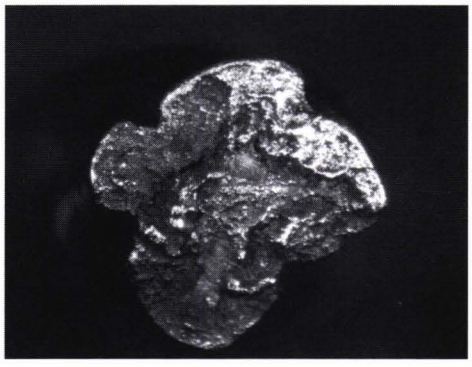

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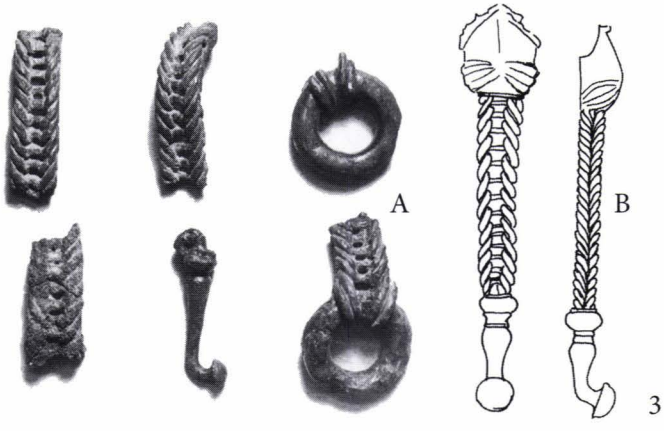

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Plate 8. 1. Microscopic images of a silver bracelet from the hoard found at Drăgeşti, Bihor County, having a low quality core and a top quality silver cover (after Toma 2013); 2. Detail of a gold pendant with a human head from Szárazd-Regöly (after Szabó 1999); 3. Remetea Mare. A. Iron chain from the grave no. 1; B. Bronze chain from the grave no. 4 (after Medeleț *ms*; Rustoiu 2008); 4. Gold necklace and Pestrup-type fibulae from the female grave no. 2/tumulus no. 2 at Seuthopolis (photo: K. Giorgiev).

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Plate 9. The silver hoard from Kovin, Museum of Vršac (photo: F. Medeleț).

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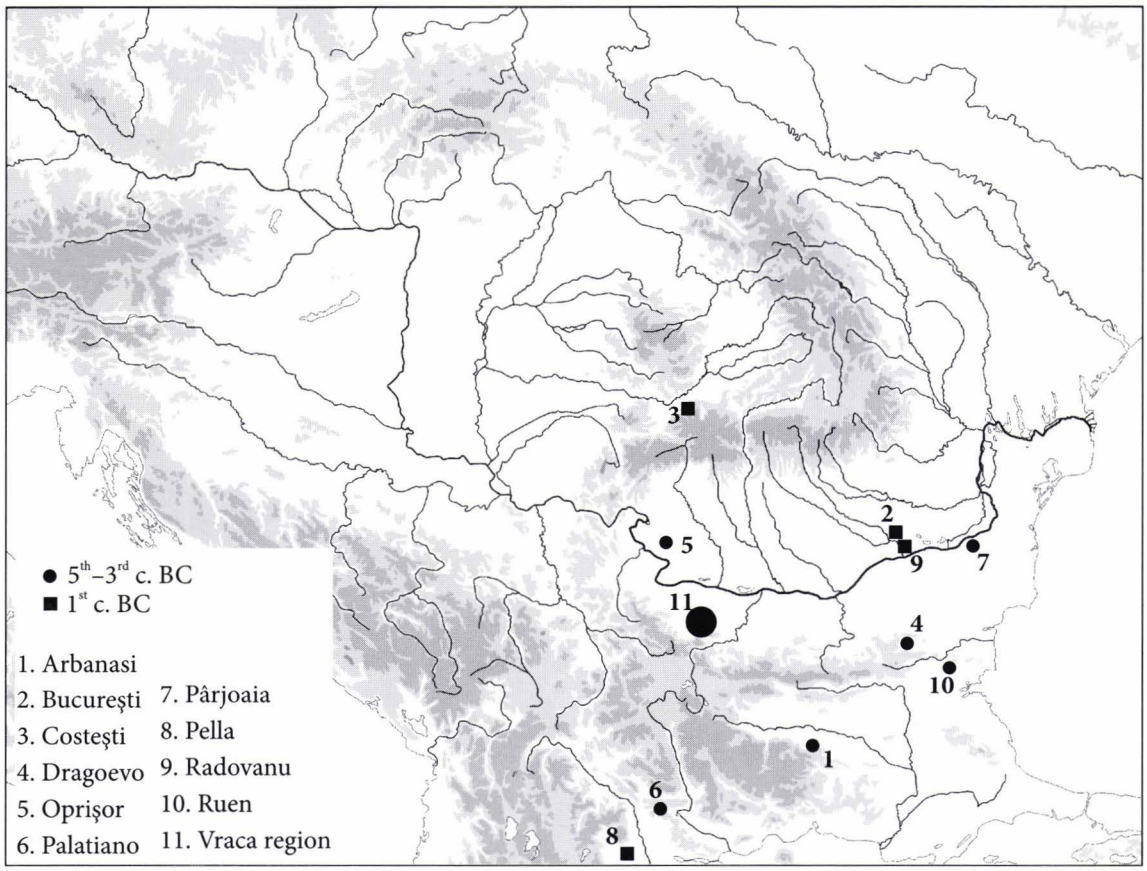

Plate 10. 1. Distribution map of the punching tools from the northern Balkans; 2–4. Punching tools discovered in workshops or contexts dated to the first c. BC. 2. Bucureşti–*Cățelu Nou* (after Leahu 1965); 3. Radovanu (after Morintz–Şerbănescu 1985, without scale); 4. Costeşti (after Gheorghiu 2004).

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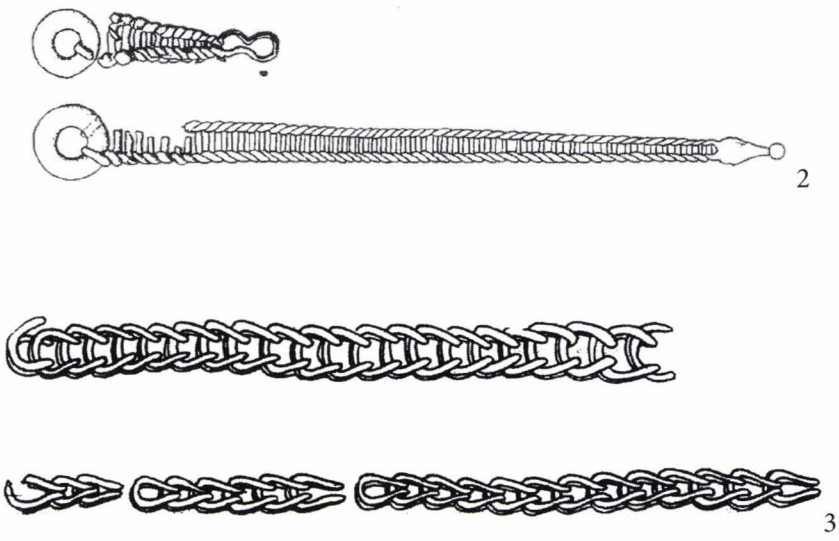

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Plate 11. 1. Distribution map of the loop-in-loop sword-chains; 2. Iron sword-chain from St. Benoît-sur-Seine (after Ginoux 2007); 3. Bronze sword-chain from Belgrade–*Karaburma* (after Todorović 1972).

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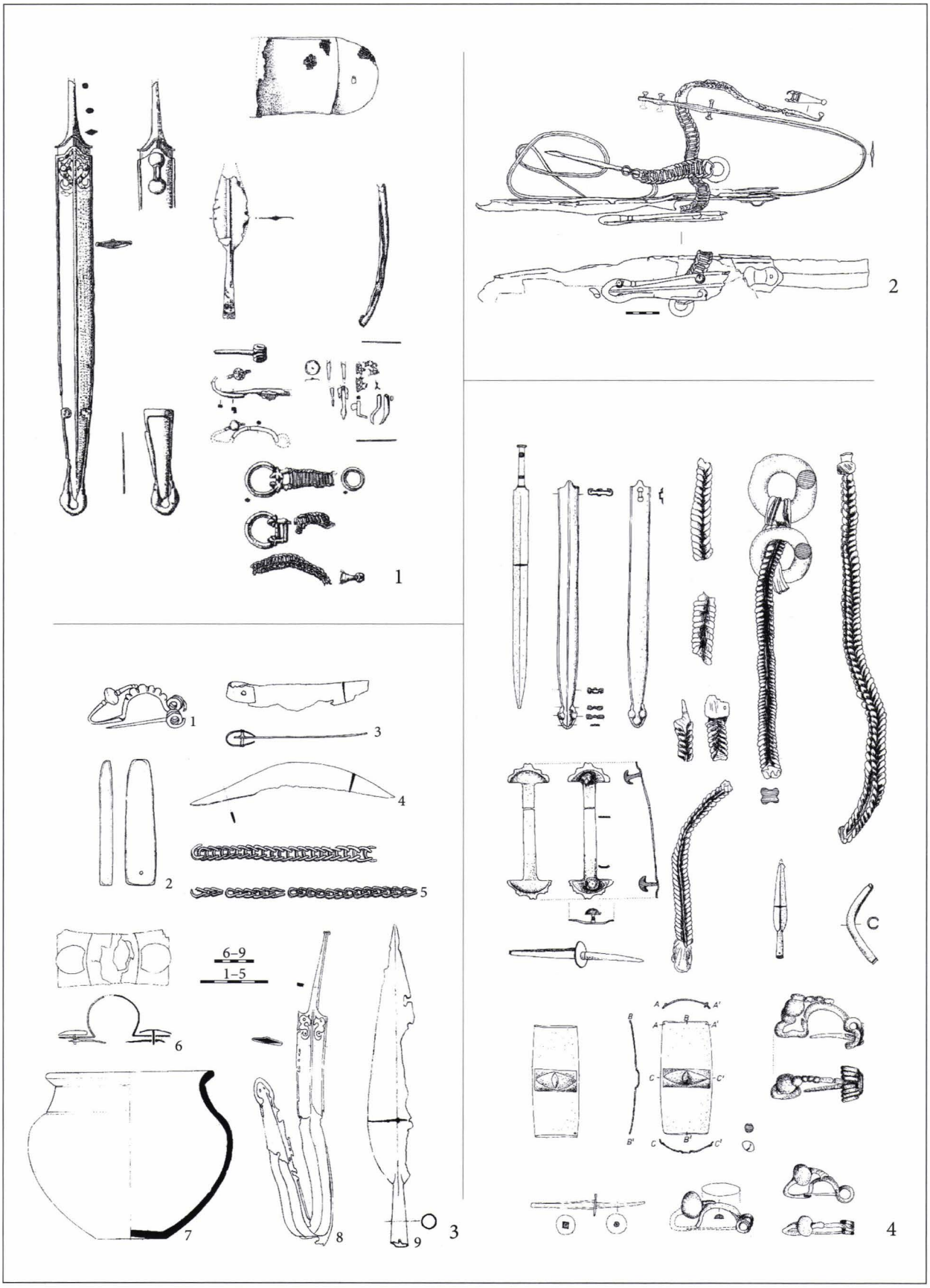

Plate 12. 1; 3. Graves containing bronze sword-chains; 2; 4. Graves with iron sword-chains. 1. Grave no. 163 from Ensérune (after Ginoux 2007); 2. Grave no. 120 from Monte Bibele (after Schönfelder 1998); 3. Grave no. 66 from Belgrade–*Karaburma* (after Todorović 1972); 4. Grave no. 9 from Remetea Mare (after Medeleț *ms*; Rustoiu 2008).

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Craftsmanship and Crafts in the Transylvanian Celtic Horizon

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For the period between the fourth century BC and the beginning of the second century BC in Transylvania craftsmanship is attested by several archaeological discoveries of workshops, tools connected to artisans and graves of craftsmen. The area chosen for our study, is the eastern periphery of the Carpathian Basin between the Tisza River and the Eastern and Southern Carpathians – Transylvania, Crişana and part of Banat. Beginning with the end of the fourth century BC the material culture and customs of the inhabitants of these regions changed radically, characterised by new type of pottery, clothing accessories and jewellery, weapons and harness mounts, all specific for the Celtic communities of Central Europe (Rustoiu 2005a, 57–58; Rustoiu 2005b, 51; Rustoiu–Egri 2011, 12–16; Ferencz 2011, 171). Not only the material culture, but also the funerary rite was similar to that of the western neighbouring territories (Berecki 2006). Beginning with the end of the fourth century BC, for almost two hundred years Transylvania was connected to the Central European La Tène civilization evolving in the same way, even participating in war campaigns together with armies from central Europe (Rustoiu 2002, 32–33; Ferencz–Ciută 2005, 239–240; Ferencz 2007, 159–160; Ferencz 2011).

From Transylvania a few small rural settlement, several cemeteries, isolated graves and incidental discoveries are known (Dietrich–Dietrich 2006). The small finds – made of iron, bronze, clay or other raw materials – have analogies in the neighbouring regions. Therefore, questions regarding their provenance – local products or imports – and the 'Celtization' of these territories are significant. Recently, interdisciplinary methods have also been applied in order to respond to these questions, suggesting new interpretative models (Hauschild 2010).

However, in the LT B and LT C periods while workshops and graves connected to craftsmen are rare in the area, there is other archaeological evidence for craftsmanship. Information about such occupations is much more numerous for the end of the Late Iron Age, respectively the Dacian civilisation (Glodariu–Iaroslavschi 1979, 36–57; Rustoiu 1996, 53–88), especially from the surrounding area of Sarmizegetusa Regia, the Dacian capital, from where, among other implements a large number of agricultural tools were unearthed (Florea 1987, 89–90; Ferencz 2001, 155).

Even if workshops have as yet not been studied in this region, the large number of artefacts revealed from 'Celtic' sites suggests the existence of local craftsmen and artisans in addition to imported wares. In this respect the mapping of the spread of several types of artefacts has been applied. Almost half a century ago the distribution of bronze chain-belts similar to the one discovered in the grave from

Iron Age Crafts and Craftsmen in the Carpathian Basin, 2014, p. 279–286

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Fântânele–*Livadă* (Pl. 1/1) indicated the existence of a specific 'Transylvanian type' belt (Crișan 1975, 51, 55). Such an approach based on distributions might indicate the production area of the artisans or the trading zone of workshops or merchants. Yet for Transylvania in this regard statistical analyses or significant field observations are lacking.

In the recently published grave M34/1970 from Fântânele–*Dâmbul Popii* (Pl. 1/2) the grave goods consisted of pottery, a fibula, an iron pin, an iron hammer and a hand-made pottery lamp (Rustoiu 2009, 10–11, fig. 2). The inventory was interpreted as indicating the burial of a craftsman, who came from the regions beyond the Carpathian Basin (Rustoiu 2009, 11). However, one cannot locate the workshop only on the inventory of the grave. Still, it is the only grave from Transylvania attesting a craftsman or smith and indeed there are only a few analogies in the neighbouring regions. (Rustoiu 2009, 9–10).

Pottery-making is much better documented in the archaeological record of the Transylvanian Late Iron Age. Quantitatively, pottery is the most numerous discoveries of archaeological excavations both in settlements and cemeteries, but so far only a few kilns have been recorded, all of them in north-western Romania. The most recent discoveries were made near Carei, at Căuceu and Aghireș (Németi 2013; 2014), while earlier, at Andrid, Satu Mare county two kilns were discovered almost side by side at a distance of half-a-metre (Pl. 1/4); with the fire chamber opened in the same pit, in which several typical LT C potsherds were found (Németi 1974, 579, 581).

Three structures from Biharea, Bihor county where kilns were investigated (Pl. 1/3) were interpreted as pottery workshops (Dumitrașcu 1979, 49–51; Dumitrașcu 1982, 158; Dumitrașcu 1991, 20). Based on the observations as described by the investigator, it seems that one of the features was in fact a pit house, with a common domestic inventory consisting of potsherds, spindle whorls and two antler tools (Pl. 2/1–2), probably used for the ornamentation of pottery (Dumitrașcu 1979, 46, fig 1; Dumitrașcu 1982, 157). In the same place raw materials such as graphite (Dumitrașcu 1991, 20) and kneaded clay (Dumitrașcu 1979, 45), used during the production and decoration of pottery were also found, suggesting the function of the feature; the graphite from Biharea shows traces of use (Pl. 2/3). The Late Iron Age graphitic wares have a large literature, the exploitation of graphite for this period being attested in Passau, South Bohemia, lower Austria, Western Moravia and probably also in present-day Slovakia (Rustoiu 1993a, 133). The presences of such raw materials over some distance indicate trading over a market over a wide area (Rustoiu 1993a, 133–135; Rustoiu 1993b, 26–27).

Recently the chronology of these pottery kilns has been discussed by S. Matei (2007, 285, note 28, 286, note 29), who considers them to belong to the 'Getic-Dacian' period. His argument is based on the lack of field observations and on the isolated character of these features, especially the kiln from Andrid, which was found outside the settlement. But similar cases were observed at Sajópetri–*Hosszú-dűlő*, where the pottery kilns were found south-east of the main site (Szabó 2007, 222). A similar situation was observed at Nyíregyháza–Oros–*Úr-Csere* (Almássy–Pop 2014). At Sajópetri–*Hosszú-dűlő* also the workshops of the smiths were on the periphery of the settlement, probably one of the main reasons being their flammability (Szabó 2007, 222). The site from Hungary with the analogous ones from the middle Danube region are an outstanding example of how the manufacturing activity was organized and structured over the whole area (Rustoiu 2009, 8) which is comparable with the evolution of craftsmanship from the Upper Tisza region in the second half of the first millennium BC (Vasiliev *et al.* 2002, 79–82). In Transylvania most probably the lack of information regarding pottery workshops can simply be attributed to the lack of research in the area.

In Transylvania bone and antler artefacts or objects with such handles are also rare in this period. In Hungary, in the thoroughly researched site from Sajópetri–*Hosszú-dűlő* among the 2636 animal bones eleven had traces of use (Szabó 2007, 273–274). The small quantity of this kind of material found in that settlement was interpreted as a prove of the dilution of utilization of bone starting with the moment of emergence of the iron tools (Szabó 2007, 273).

The objects discovered at Biharea, Bihor county (Pl. 2/1–2) were made of bone; one was used for stamping circular patterns on the vessels, the other one probably in the process of pottery modelling. Close analogies can be mentioned from grave no. 661 from Ludas–*Varjú-dűlő* in northern Hungary (Szabó 2012, 20–21, 128, fig. 176, pl. V/4). Another bone object of uncertain functionality – probably unfinished or broken piece (pl. 2/7) – was discovered at Vinţul de Jos, Alba county (Ferencz 2007, pl. 96). The handle of an iron awl discovered in 2012 in grave M40 from Fântânele–*La Gâţa* (Beldiman *et al.* 2014) was also made of antler (Pl. 2/11).

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Two curved iron knifes with handle made of bone or antler (Pl. 2/4, 6) were discovered in Satu Mare county, at Ciumeşti (Zirra 1967, 81, 83, fig. 21/IV; fig. 36) and Moftinu Mic (Németi 2010, 185–187, pl. 3/1). In Western Europe curved knives with antler or bone handles are extremely rare. Their presence in Celtic contexts in the eastern regions was connected by scholars to contacts with the Scythians (Németi 2010, 187), while others, on the basis of the analysis of similar finds from Libčice nad Vltavou–Chýnov, Praha-západ, feature 21/82 (Megaw–Megaw 2008, 529, fig. 7) have argued against Scythian influence in early La Tène art. Another artefact, a real masterpiece of the La Tène art, was found at Soběsuky, in north-western Bohemia (Megaw–Megaw 2008).

Beside finished bone and antler products a few objects which could be considered raw materials were found in two sites from Transylvania (Pl. 2/5, 8–9), at Moreşti (Horedt 1979, Abb. 22/17; Berecki 2008, pl. 50) and Vinţul de Jos (Ferencz 2007, pl. 96/5–6; Ferencz 2008, 92, pl. V/3). The presence of such raw materials in the inventory of the houses might indicate that bone tool making was a domestic craft.

Leather working is one of the 'invisible' crafts of the prehistory, with only scarce archaeological evidences. A tool used probably by such a craftsman was discovered in grave M40 from Fântânele–*La Gâţa* (Pl. 2/11; see also Beldiman *et al.* 2014). The already mentioned iron awl had an antler handle, and probably it was used in leatherworking, however its use in metal working is also possible. In both cases, its presence in a grave underlines the importance of craftsmen for their communities.

Another iron tool with a pyramidal body and sharpened head (Pl. 2/10) was found at Vinţul de Jos (Moga–Ciugudean 1995, 207; Ferencz 2007, 48, 137, pl. 94/4; Ferencz 2008, 91–92, pl. V/2). Initially it was interpreted as arrowhead (Moga–Ciugudean 1995, 207), later, based on similar artefacts from deposits of tools used in metalworking (Vouga 1923, 115–116, pl. 46; Déchelette 1927, 1371, fig. 606) it was considered a pointer (Ferencz 2007, 137; Ferencz 2008, 91–92), or possibly as an awl (Ferencz 2008, 91). Since the archaeological feature from Vinţu de Jos where the object was found, and which was interpreted as a house, lacks further evidence of metal working it seems plausible that this object was used during the process of leather working. Even if the discovery of this piece in a house would suggest that leather working was a domestic craft, the presence of this tool in the grave from Fântânele–*La Gâţa* indicates that leather-workers were specialized members of the community, with a distinctive social role, which would had been emphasized during funerary practises by placing the craftsman's tool in his grave.

The present state of research in the investigated area makes possible only general conclusions about craftsmanship of the Late Iron Age. The comparison with the well-known sites from Sajópetri–*Hosszúdűlő* or Munkačevo–*Galliš-Lovačka* however makes possible the better understanding of the organization and role of craftsmen in their community (for detailed discussion see: Rustoiu 2010, 57–58), defined by a predominantly rural character.

Frequently both the funeral ritual and the inventory of the graves are considered as markers for the occupation of the buried person, reflecting the person's identity and the manner in which they were perceived by the community. This is the case of the graves from Fântânele–*Dâmbul Popii* and Fântânele–*La Gâţa*, both inventories interpreted as belonging to craftsmen.

When summarizing the evidence regarding crafts and craftsmen in Transylvania beside the state of research one should also take into consideration the predominance of tools and craft-related objects made of perishable materials. Yet, the presence of specific artefacts in Late Iron Age settlements and cemeteries indicates the presence of both specialized craftsmen and domestic practitioners of several crafts.

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List of plates

Pl. 1. 1. Bronze belt from Fântânele–*Livadă* (after Crişan 1975, without scale); 2. Fântânele–*Dâmbul Popii*, grave M 34/1970 (after Rustoiu 2009, different scales); 3. Potter kiln from Biharea (after Dumitraşcu 1982); 4. Pottery kilns from Andrid (after Németi 1974).

Pl. 2. 1–2. Vessel ornamenting tools (after Dumitraşcu 1979); 3. Piece of graphite found in Biharea (after Dumitraşcu 1982); 4. Iron curved knife with antler handles from Ciumeşti (photo I. V. Ferencz); 5. Antler from Moreşti (after Horedt 1979); 6. Curved iron knife with antler handle from Moftinu Mic (after Németi 2010); 7. Piece with unknown functionality from Vinţu de Jos (drawing: M. Manea); 8. Bone and antler with marks of processing (drawings: M. Manea); 9. Boar fang from Moreşti (photo: S. Berecki); 10. Iron awl from Vinţu de Jos (drawing: M. Manea); 11. Fântânele–*La Gâţa*, M40, iron awl with antler handle.

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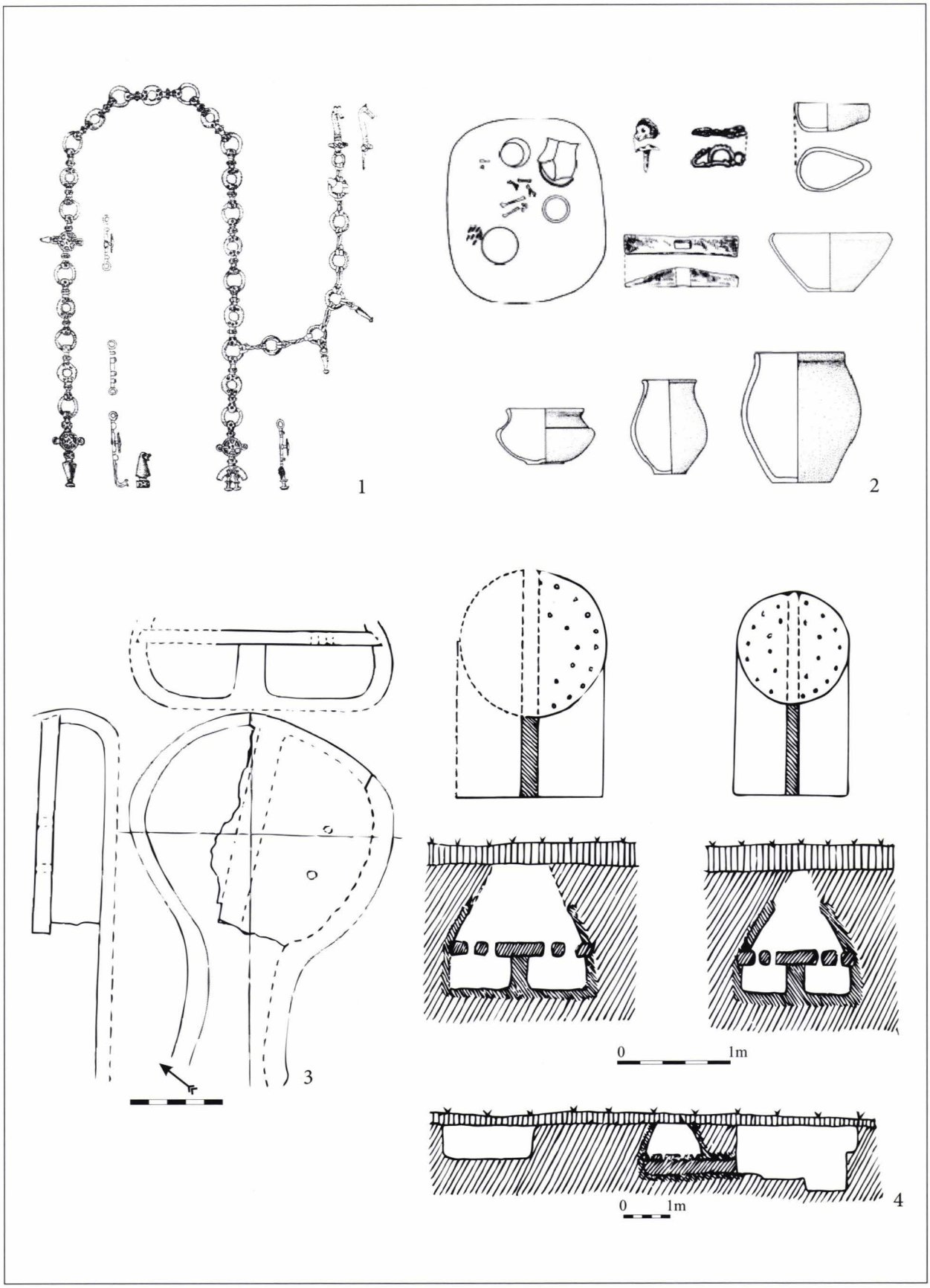

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Scordiscan Potters in Action: A Late Iron Age Pottery Kiln from Karaburma

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One of the major technological innovations introduced to the southernmost Pannonian and north Balkans populations of the Early Iron Age/Hallstatt period was use of the potter's wheel. It is a commonplace in older literature (Todorović 1968; 1974b; Jovanović 1987) that it was only after the Celtic arrival at the Balkans, i.e. after the formation of the Scordisci in the mid-Danube basin that potter's wheel was widely accepted, although not universally. Much pottery produced in the oppida of the Scordisci – even in the first century BC – was hand-made side by side with a significantly greater amount of wheel-thrown pottery of excellent quality. Advantages of the wheel-thrown vessels were numerous: good technical characteristics and physical appearance, as well as fast production and a large range of forms. Ceramic forms of Scordiscan pottery were reduced to some basic types, always with a clear function. The Scordisci produced pottery for trade too, as it is testified by the massive production centres. Capacity of these pottery centres was, as a rule, far greater that the needs of an individual settlement (Jovanović 1987, 845).

Among the Scordiscan pottery production centres, the first to be mentioned is Gomolava, on the river Sava in the Syrmia region. In the case of Gomolava, there are smaller craft centres in the settlement, which comprised clusters of cylindrical pottery kilns, with double firing chambers and circular flue plates, with openings for hot air arranged in concentric circles. This model of kiln remains in usage over a long period of time even during the Roman period in the region (Jovanović 1987, 830; Jovanović–Jovanović 1988, 76, 91, 98, pr. 9, 10, pl. 9; Jovanović 2009, 127). The most recent excavations of the site Čurug–*Stari vinogradi* on the Tisa River in the region of Bačka, have brought to light two workshops with seven pottery kilns and numerous finds which testified to the process of pottery making, such as experiments on clay before firing, parts of dried but not fired pottery, and wasters.[1] At the sites in eastern Slavonia, most numerous are pottery kilns in Osijek–*Donji Grad*. Some twenty kilns clustered in one particular part of the settlement have been discovered so far. Around the kilns there were dumps of wasters and pits filled with late La Tène pottery (Dizdar 2001, 95). During research into the fortified settlement in Vinkovci–*Dirov Brijeg* at the part of the site next to the river Bosut, there were five pottery kilns, defining that part of the settlement as craft quarters specifically for pottery production. The

1 Information courtesy of Stanko Trifunović, who has been conducting the excavations at Čurug.

Iron Age Crafts and Craftsmen in the Carpathian Basin, 2014, p. 287–296

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immediate vicinity of Bosut undoubtedly had an influence on the decision to make that part of the settlement at its margin as craft quarters. Pottery kilns from Dirov Brijeg, like other La Tène kilns, belong to the vertical type with firing chambers dug into the subsoil (Dizdar 2001, 95).

Despite existence of these sites with extensive evidence of the craft of pottery making, the inspiration for this study came from a single find from the complex of La Tène settlements and cemeteries in the area of Belgrade–*Karaburma*. The cemetery and the settlement which was partially excavated to the north-west of the cemetery, undoubtedly belonged to the Scordisci. They were connected to the proto-historic Singidunum during the period of the third to first century BC. No historical source directly mentions the Celtic town at the Danube and Sava confluence. The Celtic newcomers did not settle in this locality; there is no trace of Celtic settlement at the Upper Town of Belgrade. They settled in the zone next to the settlement of the indigenous population on the Danube bank by present-day Višnjička and Uralska streets (Todorović 1962; 1963a; 1963b; Тодоровић 1974a; Perišić–Stančić 1975).

Excavations at Karaburma, which started as a rescue project and developed into a systematic series of campaigns, were carried out from 1958 to 1963 under the direction of J. Todorović. Excavations at Karaburma cannot be separated from the excavations which were took place in 1954 and 1961 at the neighbouring site of Rospi Ćuprija. The two sites are complementary and make an archaeological whole forming a unified picture of the proto-historic periods in the region (Тодоровић 1956; Todorović 1972; Тодоровић 1974a; Вранић 1985).

After a long break, another series of systematic excavations under the same direction started in 1973 at the sites of *Zelena pijaca* and *Višnjička ulica*. In the yard of a house at 102 Višnjička street, two dwelling horizons with pottery belonging to the Eneolithic Coţofeni culture, were detected as well as some sherds of La Tène pottery (Вранић 1985, 35).

Small-scale rescue excavations were also conducted in the yard of the *Minel boiler factory* in 3 Uralska street, in 1975, under the direction of S. Perišić. On this occasion, the western border of the settlement area of the Bronze Age (Bz B2–Ha A2) and La Tène (first century BC–first century AD) were detected (Perišić–Stančić 1975, 38–40; Вранић 1985, 35–36).

When in 1980 a new series of building activities was about to begin at Karaburma, an unexpected chance to get a fresh, though only fragmentary insight into settlement remains occurred. In the course of rescue excavations in the yard of the *Sport Export-Import company* at 84 Višnjička street, under the direction of S. Perišić, a single-chambered domed updraught pottery kiln (Pl. 1/1) was discovered, along with some complete and some fragmentary La Tène pottery from the first century BC–first century AD (Perišić 1981, 57–58; Вранић 1985, 36).

Being an updraught kiln, it had enclosed firing chambers in which the heat moved upward from underneath the pots and then was vented outwards. Fuel was fired in a firing chamber through a stoke-hole, through which air was also allowed through. The flames and combustion products rose through flues in the top of a fire chamber, which was also the floor of the pottery firing chamber, and exited through flues or openings at the top of the kiln (Rice 2005; Kreiter 2008).

The dome of the Karaburma kiln was partially damaged. Since the upper part of the dome was missing, the inner part of the kiln was uncovered down to the flue plate which was made of fired clay, with circular perforations. After that, the pear-shaped firing chamber was explored, as well as the ash pit in front of it which contained sherds and lumps of soot. The pit in front of the firing chamber was dug into the original loess subsoil (Pl. 1/1). An unsuccessful attempt was made to remove the remnants of the dome and the flue plate in order to consolidate and conserve them.

The kiln was made of clay which after firing took on the appearance of daub. A pear-shaped firing chamber was dug into the loess subsoil. The 100–120 mm thick kiln foundation supported the dome. The flooring of the firing chamber was daubed with clay. The firing chamber was hollow, extending beneath the whole kiln. It was wider at the bottom, narrower at the flue plate. The massive, 240 mm thick and 1 m in diameter, flue plate was placed above the firing chamber. It was made of fired clay with circular perforations the diameters of which varied from 30 to 70 mm.

Above the flue plate there was the dome, which was damaged since the lower part of the dome was only partially preserved. The dome opening was not located, so there is a possibility that it never existed. It is also possible that it was placed at just that point where the dome was damaged. If there had been an opening, it must have been positioned to the right of the axis of the firing chamber and mouth. The

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dome was made of fired clay, covered on the inner side with daub which was smoothed and had been fired. The dome walls were too dilapidated to be preserved. On the flue plate, which had also been covered with daub, there were a number of sherds.

More than 300 fragments of clay vessels were discovered from several structural parts of the kiln and the surroundings. However, following the excavations only two vessels with more than 80% surviving could be reconstructed. Therefore, a reasonable conclusion could be drawn that the infill of the kiln consisted of secondary deposited sherds, fragments which were kept near or in the kiln as raw material for tempering. Sherds found in the fuel chamber show signs of secondary firing, which could also imply that they were deposited there during the use of kiln. The majority of the sherds were discovered on the floor of the pottery firing chamber, and they were probably deposited there as waste products after the last use of kiln (Pl. 1/2).

Clay used for vessel building was not subjected to physical or chemical analysis, therefore only limited observations concerning the natural clay properties can be made. Macroscopic analysis shows that clay paste has a very little amount of naturally occurring admixtures mainly consisting of small-grained siliceous and quartz sand. Other naturally occurring impurities were not observed in the Karaburma clay. Thus this could mean that either the source where the clay was dug out was very pure or the process of refinement was carried out meticulously. Various types of tempering material were macroscopically observed (Pl. 2/1). Type and size of the tempering material are not strictly related to the type and size of the vessels. Generally speaking, although medium and large-sized vessels for preparing food were tempered with bigger quantity of temper material, there are also small-sized vessels, which were used for food consumption which contained bigger quantities of temper material. The main admixtures include inorganic and organic tempers such as sand, crushed rock, crushed sherds and crushed shells. Chaff was only observed secondarily, in the cases of secondary burnt fragments, where small cracks were observed on the places where chaff had been contained in the paste.

It has already been mentioned that although there was evidence for Late Hallstatt use of the potter's wheel, traditionally Scordiscan tribes had the reputation as the ones who had brought the wheel-throwing technology to the Central Balkans. A majority of the recovered fragments from the pottery kiln at Karaburma were wheel-thrown (Pl. 2/5–7), while only a limited number of hand-built vessels were identified. Vessels used for the serving and consumption of food were generally wheel-thrown, while larger vessels were hand-built, usually using the coil technique. However, there are several fragments of large-sized vessels which were also wheel-thrown. All sherds of large-size vessels were certainly secondarily deposited in the kiln, since because due to their size they could not be fired in the firing chamber of the Karaburma kiln. On the other hand, there are several examples of small-sized vessels which were hand-made.

After the drying, and before or after the firing of vessels, their inner and outer surfaces were smoothened and burnished. Direct evidence for this is the clay burnishing, which was discovered in the kiln (Pl. 3/2). The tool itself is also secondarily fired, and it had been intentionally deposited in the ash pit near the kiln. The inner surfaces of all types of vessels were generally highly burnished, while outer surfaces of many large vessels made for food preparation were left plain. Outer surfaces of wheel-thrown bowls are nicely burnished, sometimes even polished.

The majority of pottery fragments from the kiln, more than 80% of them, were undecorated, which is in line with contemporary La Tène pottery production in the region (Sladić 1986). Only two decorative techniques have been identified. The most common technique is incising, which was carried out either before or after firing of the vessel. The exact time of the incising was observed on all of the fragments, since pre-drying incising could easily be identified by observing the irregular direction of lines caused by applying the instrument on the still wet clay. Motifs executed with incising are simple linear rows of slanting or vertical parallel lines; brush strokes were also identified (Pl. 2/8–9). Burnishing with simple curved lines is represented on only a few fragments of decorated vessels (Pl. 2/10).

All fragments found in the kiln are fired in a completely or partially oxidizing atmosphere which has resulted in a clear and uniform coloration of surfaces and throughout the body of the pots. A majority of sherds are of brown and light grey colour. There are some dark grey and black coloured sherds which were either the result of secondary deposition within the kiln or they were uneven in colour, since the kiln was not producing a proper reducing firing atmosphere. A significant number of the fragments from the kiln were secondarily burnt.

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Vessels recovered from the Karaburma kiln fit well into the typology of the Middle and Late La Tène pottery production in the broad region of South Pannonia and Central Balkans (Todorović 1972; Sladić 1986). Several basic morphological types could be identified: bowls, pots, amphorae, pythoi. The main morphological shape with the highest degree of typological variability is the biconical bowl with S-profile and horizontally fluted neck (Pl. 2/1). More than 70% of bowls are of this type, while only a few fragments of conical bowls were identified. Comparing morphological resemblance of the bowls from the contemporary graves in the nearby Karaburma cemetery resulted in the fact that the type was found in the cremation graves 20 (Todorović 1972, 21–22, T. VII/1), 34 (Todorović 1972, 21–22, T. XIV/2), 39 (Todorović 1972, 16, T. XV/2, 3), 40 (Todorović 1972, 22, T. XVI/3) and 56 (Todorović 1972, 24–25, T. XIX/3). The bowl from the grave 34 came from the earliest funerary context, dated at the end of the third century BC. The rest of the bowls are of later date and are attributed to the second and first centuries BC (Todorović 1972, 50; Sladić 1986, 25–28).

Pots are usually pear-shaped with small strap handles laterally positioned. Despite much broken, pots of the so-called situla type with brush stroke decoration can be recognized among the ceramic material. They are of great chronological significance, because pots belonging to the same type were found in some of the graves in the Karaburma cemetery. Pots from the cremation graves 39 (Todorović 1972, 21–22, T. XV) and 56 (Todorović 1972, 24–25, T. XX) were found together with bowls with a S-profile – the dominant shape of the ceramics from the Karaburma kiln. All of the graves were dated at the first century BC. Appearance of the type of pots cannot be dated earlier than the end of the second century BC (Todorović 1972, 55; Sladić 1986, 25–28).

Large storage vessels are extensively broken with not a single vertical profile shape which could be reconstructed after sorting of the sherds; this may imply that they were secondary positioned in or around the kiln. Aside from the traces of exposure to fire on the several pots (Pl. 3/3), none of the functional use-wear traces were observed on the recovered sherds. Pythoi are generally the type of pottery commonest in settlements. The Karaburma cemetery revealed that funerary rituals for only two deceased, cremated and buried in the graves 99 (Todorović 1972, 32–33, T. XXXI) and 103 (Todorović 1972, 33, T. XXXI), included large storage vessels. The pythoi from both graves were only partially preserved and have been chronologically placed at the end of the first century BC (Todorović 1972, 53).

The fact that the vast part of the pottery corpus recovered from and around the kiln is considerably fragmented has allowed only limited metric analysis of the data. Metric analysis carried out only on the bowls (Fig. 1) showed that around 47% of the bowls have a rim diameter in the range of 190–220 mm, 34% of them have a rim diameter of 22–25 cm, 11% have a rim diameter less than 220 mm while 8% of the analyzed bowls have a rim diameter greater than 250 mm. Quantification of rim diameters shows that the bowl production was highly standardized. Taking into account that the majority of the recovered sherds from the kiln belong to the bowl type, the firm conclusion can be drawn that the kiln was mainly used for bowl firing.

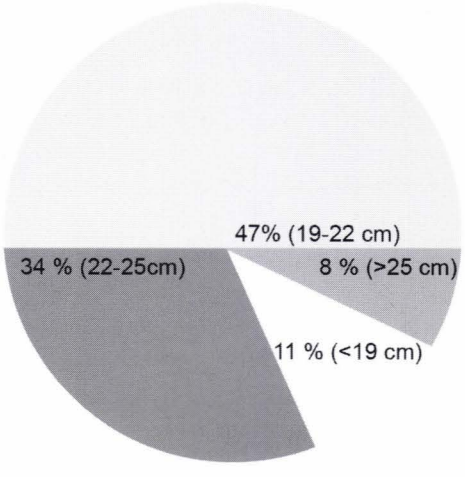

Fig. 1. Bowl rim diameter dimensions.

A. Leroi-Gourhan introduced the concept of *la chaîne opératoire* in 1964 in his seminal book *La geste et la parole* (Leroi-Gourhan 1993). The concept recognizes the dynamic process of tool manufacture and use, as well as the accompanied socio-cultural agents. The main idea behind the *chaîne opératoire* theoretical paradigm was Leroi-Gourhan's opinion that technological tradition of a community like cult, religion and economy, also shapes the identity of the community. Taking into account the fragile state of evidence of other aspects of prehistoric life, technological studies could thus bring bigger benefit in research agenda. The main concern of Leroi-Gourhan's research into prehistoric technology was Palaeolithic flint knapping (*cf.* Leroi-Gourhan 1993, 101, fig. 48). Through the implementation of the *chaîne opératoire* concept he succeeded to recognize basic sequences of flint knapping technology. His cross-cultural examination showed that even on a micro-regional level different communities

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have different technological traditions which are observable only through careful analysis of the same sequence of tool making.

The concept was later used in various fields of ancient technological studies, such as metallurgy, pottery production, tool production (*cf.* Ottaway 2001; Gaydarska *et al.* 2007; Michelaki 2008; Bar Yosef–Van Peer 2009; De La Fuente 2011). The *chaîne opératoire* gained full acceptance when in the operational sequencing of technological process accompanied socio-cultural aspects were also taken into account.

In the various sequences of pottery production the *Chaîne opératoire* could be directly or indirectly observed in the Karaburma kiln material (Fig. 2). Since our analysis was carried out following standard macroscopic observations, without applying provenance, geological or chemical studies, the first two sequences (clay and temper procurement and transportation) could not be identified. Preparation and processing of the clay somewhere near the location of the kiln are attested owing to the discovery of the lump of clay prepared for throwing as well as the clay burnishing tool. Vessel building is not directly attested at Karaburma, but analysis of sherds from the firing chamber shows that the majority of vessels fired in the kiln were wheel-thrown. Only a small number of hand-built vessels were recovered. Firing of the vessels was attested owing to the find of the updraft kiln. Analysis showed that the firing was carried out mainly in an oxidizing atmosphere, and that probably small and medium sized vessels were fired in the kiln. Finishing of the vessels was also attested indirectly, since no tool for decoration of the vessels was found. However, fragments of vessels decorated using incising or burnishing techniques were discovered. Trade and circulation of the vessels fired in the Karaburma kiln are indirectly confirmed taking into the account the morphological resemblance of the vessels found in the contemporary graves at the nearby cemetery. However, only further mineralogical analysis will prove that. Vessel use is indirectly attested by the presence of pots with fire marks and soot traces at the base and on the body. Those vessels were probably used by potters themselves. Breaking and reuse are also confirmed indirectly. The majority of sherds recovered from the ash pit near the kiln probably represent the piling up of the tempering material for vessel building. Deposition and waste are again indirectly attested as in the case of the circulation of vessels.

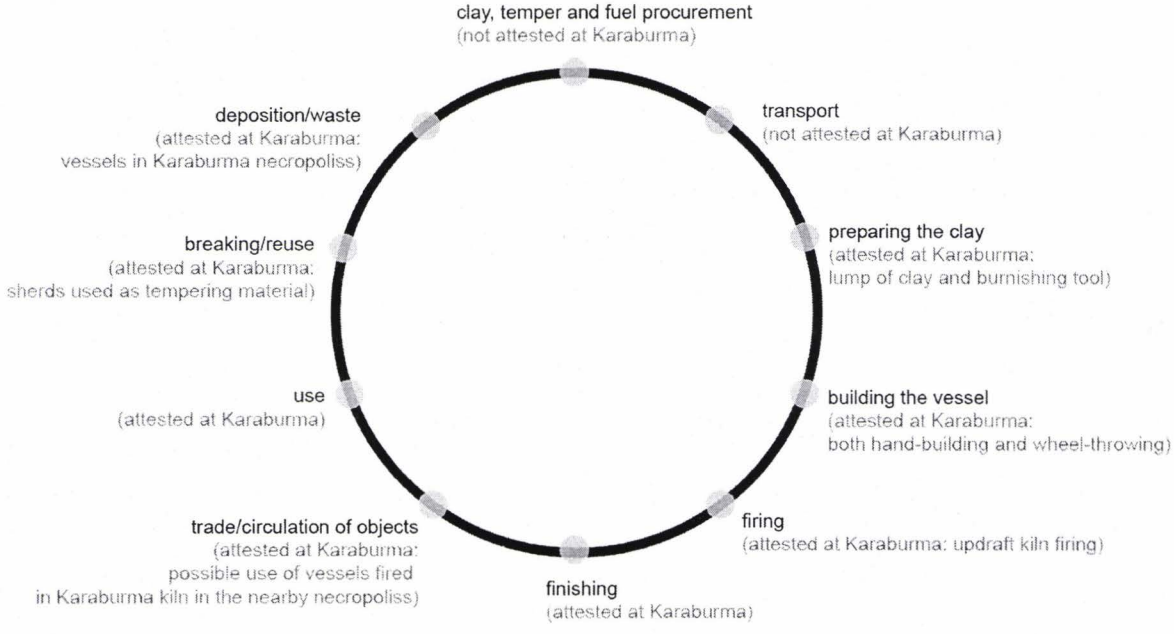

Fig. 2. *Chaîne opératoire* of Karaburma kiln pottery production.

Each stage of pottery production *chaîne opératoire* is developed under the myriads of various socio-cultural agents, majority of which remained theoretically undebated. Main social impetus in any technological operation is tradition. Why something is crafted or processed in this way and not in other is immanent in community's tradition, and it is often accepted for granted for generations of potters, metallurgists, tool makers etc. Decoration of clay vessels is maybe the most obvious example in archaeological

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contexts. The fact that all La Tène vessels from both Karaburma cemetery and settlements are fashioned in similar way speaks about continuity of technological tradition. The only exceptions are vessels from Early La Tène period which were made under the strong influence of Late Hallstatt tradition, and pottery production from the latest La Tène period which fell under the early Roman technological influences.

Social organization and social complexity are among the most important agents that shape technology. The potters which were producing clay vessels from the Karaburma kiln lived in the dawn of the proto-historic Singidunum, in the time when social diversification had already started. Those people were probably specialized craftsman who cared about the inherited technological tradition but were also already aware of the demands of the market, which could also lead to the break with some of the traditional procedures.

Age and gender issues are also very important in technological studies, but are amongst the least visible components of every technological activity. Statements that mainly women produced pottery in much of the prehistoric Balkans will remain highly plausible for very long time, since there is neither direct evidence for such a claim, nor evidence against it.

***

Defining different stages of pottery production attested at the site of Belgrade–*Karaburma, Višnjička street*, was one of the main aims of the study. This complex technological process was undoubtedly affected by numerous and in some cases hardly traceable socio-cultural agents. Elements of the *chaîne opératoire* confirmed by the analyses of the pottery kiln and the archaeological material from the same context were preparation and processing of the clay in the immediate vicinity of the kiln, and firing of the vessels. The analysis of the pottery from the kiln has also revealed indirect evidence for the usage of the vessels, their breaking and reuse, and final deposition as waste.

Trade and circulation of the vessels fired in the Karaburma kiln are indirectly confirmed taking into account the morphological resemblance of the vessels found in the contemporary graves at the nearby Karaburma cemetery. A proposed model suggests that the community – family, relatives, friends, neighbours – who took care of the funeral of the deceased buried in the graves could have used the vessels produced in the pottery production centre to which the Karaburma kiln belonged. The individuals buried in the graves could have used the same types of pottery also during their lifetime. There is a possibility that some of these last were potters and were buried together with their own products, but our present methodology is far from being able to give the final solution to this possibility.

Socio-cultural relations and current economical or political situation both on the micro and macro scale influence the technology. As we already mentioned, Scordiscan potters from Karaburma managed to adjust their technology in the turbulent times of the Romanization of the Central Balkans, by learning new technological skills in order to continue their craft. Until examination of the residential zone of Celtic Karaburma is possible, our analysis must remain an attempt to bridge the gap between the death and life in early historic south Pannonia and central Balkans.

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List of figures

Fig. 1. Bowl rim diameter dimensions.
Fig. 2. *Chaîne opératoire* of Karaburma kiln pottery production.

List of plates

Pl. 1. 1. Pottery kiln from Karaburma – technical details; 2. Pottery fragments on the floor of the firing chamber.
Pl. 2. 1–4. Types of tempering material: 1. Bowl interior tempered with large crushed stone fragments; 2. Pot exterior tempered with large amount of crushed stone; 3. Bowl interior tempered with fine silicious sand; 4. Pot interior tempered with crushed stone and crushed sherd fragments; 5–7. Pottery building techniques: 5. Base of a wheel-thrown vessel; 6. Interior surface of a wheel-thrown vessel; 7. Fingerprint on exterior surface of a wheel-thrown vessel; 8–10. Decoration techniques: 8–9. Incising; 10. Burnishing.
Pl. 3. 1. S-profiled biconical bowls; 2. Clay burnishing tool; 3. Bottom of a pot with traces of carbon residue on the inner surface, and traces of soot on the base and on the exterior surfaces of the pot.

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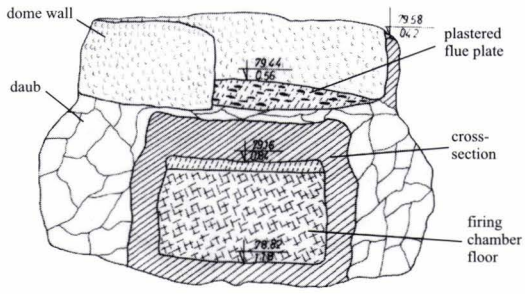

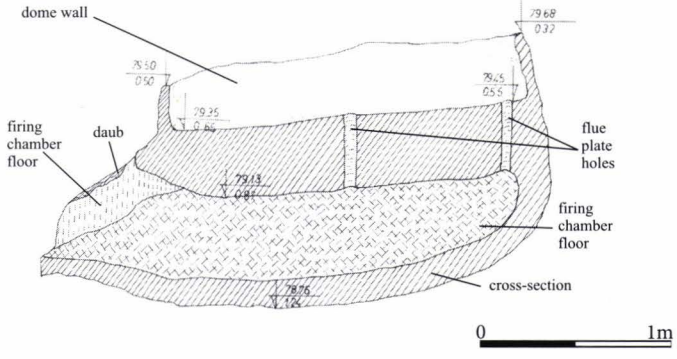

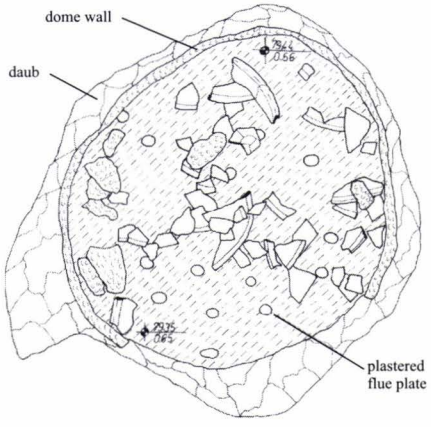

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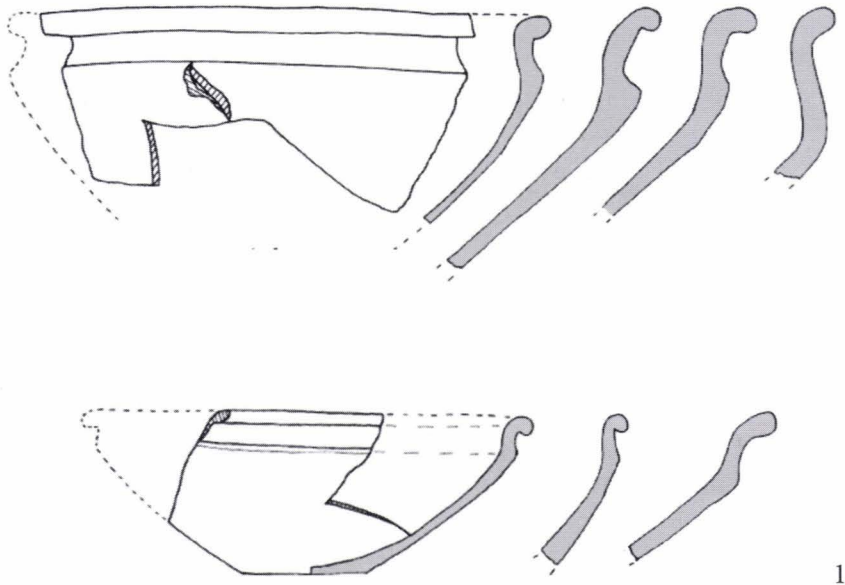

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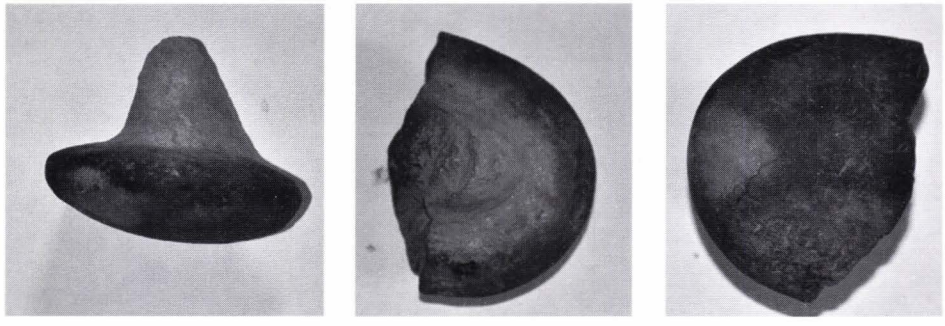

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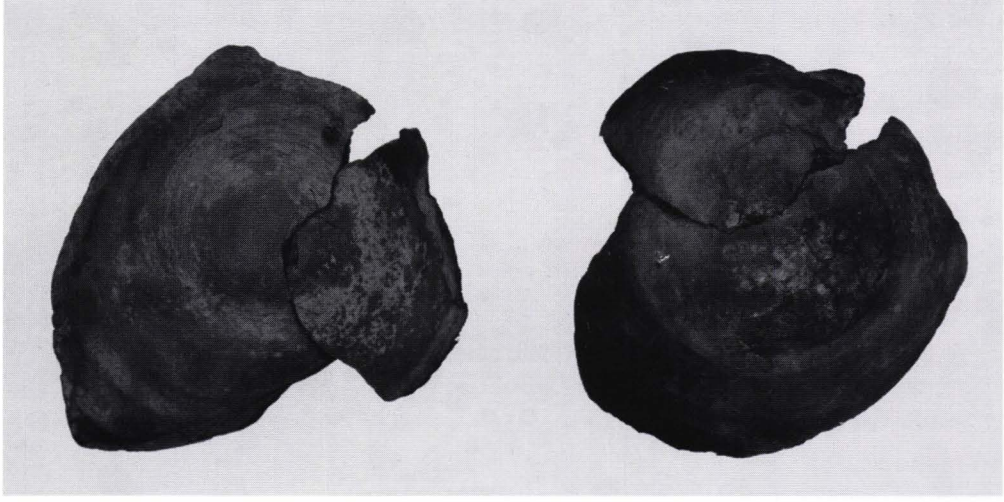

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Plate 3. 1. S-profiled biconical bowls; 2. Clay burnishing tool; 3. Bottom of a pot with traces of carbon residue on the inner surface, and traces of soot on the base and on the exterior surfaces of the pot.

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Craftsmen in the Celtic Cemetery of Karaburma, Belgrade

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Keywords: Scordisci, craftsmen, cemetery, grave, Karaburma

From the period of Celtic domination in the Serbian Danube Valley, craftsmen's graves represent a rather rare archaeological find, despite the fact that craft products of the Scordisci were well-known for their quality, some even for their artistic values. At the same time, in Serbian and in the rest of former Yugoslav archaeology, there were no papers dealing with Scordisci craft, while on the other hand, craft products were mentioned in a more general context (Todorović 1974, 63).

At the level of research, it has unfortunately only been possible to determine some of the graves from the Karaburma cemetery in Belgrade as craftsmen's graves (Fig. 1). This is due to the fact that other grave finds from Serbia mostly represent chance finds without a more precise context. This paper also includes finds which indicate the existence of specific crafts and which were discovered at the Karaburma cemetery, but without specific context, as well as a greater number of single-bladed scissors for shearing sheep which have been discovered in eleven graves.

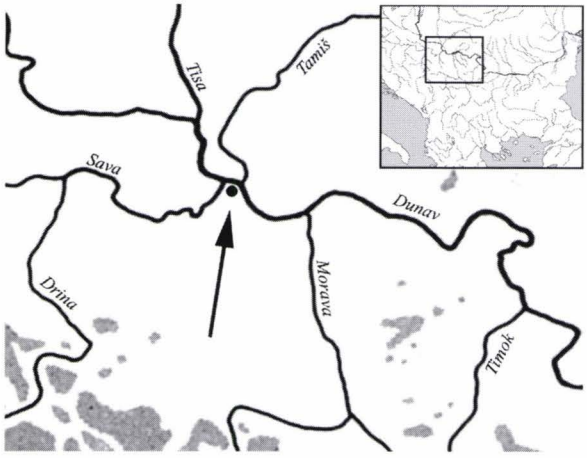

Fig. 1. Karaburma. The location of the site.

Grave 31 represents a cremation. Grave-goods include an iron spear and a 102 mm long iron axe (Fig. 2/1), with the upper end on which an iron nail remained preserved (Todorović 1972, 19). We consider the object as a scraper or chisel rather than an axe.

Grave 50 is also a cremation which includes a larger urn, while the grave-goods and ornaments were scattered around it. Apart from several pottery vessels, there were also two spears, an iron knife, fragments of iron nozzles, arm-rings made of iron wire, a damaged object in the shape of a trident and an iron axe (Fig. 2/2), with a semi-circular blade and rectangular nozzle measuring 95 × 80 mm (Todorović 1972, 23–24). This object also would be a scraper or a chisel rather than an axe.

In cremation grave 104, 150 mm long iron tongs were discovered (Fig. 2/3), as well as a 165 mm long iron object (Fig. 2/4), with damaged flanges at one end, while the other end is ring-shaped (Todorović 1972, 33).

At the Karaburma cemetery, there are a number of single-bladed iron scissors. They were discovered in graves 4, 37, 41, 51, 62, 92, 97, 112, 137, 172 and 222. Also from Karaburma, but without a specific context, a composite iron tool was discovered with a long facetted handle (Fig. 2/5). On one end, there is

Iron Age Crafts and Craftsmen in the Carpathian Basin, 2014, p. 297–300

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an awl, while on the other end there is a semi-circular blade – possibly a cutter or a scraper. The object is 180 mm long (Todorović 1968, 147).

In cremation graves 31 and 50 there was an iron scraper or a small shovel. Although both were described as axes (Todorović 1972, 19, 23–24), numerous parallels show that these were tools primarily used for processing leather (scraper), wood (chisel) or as small shovels for cleaning plowshares. Scrapers were used in the process of tanning leather, for removing fat and fur and remain unchanged through to the Middle Ages (Брмболић 2000, 109). Chisels, on the other hand, were used for different purposes, mostly for wood-working, but also stone and metal processing (Поповић 1988, 129). It is less possible that one is here dealing with a shovel used for cleaning plowshares. Both of the objects occur in the so-called 'warrior graves', but they were certainly not weapons and certainly not axes. In order to describe an object as an axe, it has to have a blade placed parallel to or at a slight angle with the handle.

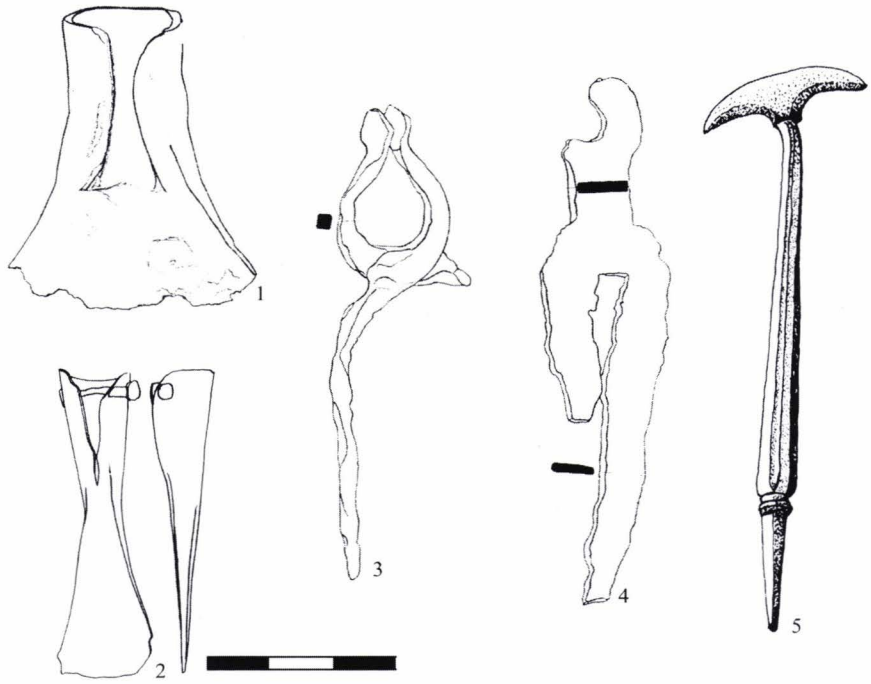

Fig. 2. Tools in the cemetery of Karaburma. 1. Grave 31; 2. Grave 50; 3–4. Grave 104; 5. Isolated find.

In cremation grave 104, iron tongs were discovered, as well as a part of an iron object of unknown function. Tongs are usually associated with blacksmiths and were used for holding objects while working the rest of them with a hammer on an anvil, during cutting and shaping. In grave 104, bowed tongs with rectangular cross-section were discovered, their terminal fastened in a joint, with flat handle endings, which are long and parallel. Such a type of tongs was used in the Mediterranean area already at the end of the second millennium BC (Поповић 1988, 143). Another object from this grave is quite atypical and represents most likely an unfinished object rather than a completed tool. Both finds suggest that the grave 104 most likely represents the burial of a blacksmith.

A composite iron tool with a long facetted handle also comes from grave 104. On one end, there is a short gimlet, while on the other end there is a semi-circular blade, possibly a cutter or a scraper. There are no parallels for this type of tool from Serbia. It has been described as shoemaker's knife (Todorović 1968, 79) which most likely corresponds to its actual purpose, although, generally speaking, it could also be described as tanner's tool.

A tool of possibly similar function, described as a hinged knife, was discovered in grave number 48 from the Iron Age cemetery of Pottenbrunn in Austria. The whole grave, dated to LT B1/2 which contains numerous other tools – knives, shears, whetstone – was ascribed to a shoemaker (Ramsl 2002, 139–140, Taf. 36/16).

From the graves at Karaburma there are eleven one-piece shears, with a U-shaped bow and with blades close together, possibly used for shearing sheep. On the other hand, such shears came into use at

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the beginning of the third century BC and belonged possibly to personal use, that is for cutting hair and trimming beards and not as tools (Jacobi 1974, 87). In favor of this hypothesis are also the Karaburma finds, where nine scissors were discovered in the so-called 'warrior graves', actually as a feature of the burial rite which included some kind of offensive weapons as grave-goods.

A number of shears shaped in the same manner also come from Pottenbrunn (Ramsl 2002, Taf. 37/7, Taf. 60/7; 65/11; 69/3; 71/5; 77/6). At this site most of the shears come from female burials, since the other associated grave-goods include bracelets, fibulae and pendants and other typically female objects. Only grave 562 (Ramsl 2002, 144–145, Taf. 65, Abb. 11) undoubtedly represents a warrior's grave since its inventory also contained a spear and a sword with richly decorated scabbard. The grave is dated to LT B2/C1 phase, or the third century BC (Ramsl 2002, 144).

All the three above-mentioned Karaburma graves belong to the third and the second century BC, a period of stabilization and prosperity of the Scordisci in the area of the middle Danube valley (Jovanović 1987, 836). Iron shears, often encountered among the finds from this cemetery, can also indicate a kind of craft, although they might also have been used for different purposes. Apart from grave-goods from Karaburma, several accidental finds from the same site include tools from the Late Iron Age, indicating craft activities (Todorović 1968, T. XLVII/7, XLVIII/2–5, XLIX/16). They mostly include tanners' knives, used for cutting and processing leather, a form which remained unchanged until the Late Middle Ages (Брмболић 2000, 111). These are knives with angled handles and outwards turned and curved blades. The best parallel is an object described as multifunctional iron instrument discovered in grave 520 from Pottenbrunn (Ramsl 2002, 141, Taf. 60/8). This instrument has been interpreted as a pharmaceutical tool, used for crushing and preparing different substances (Künzl 1995, 221).

Although according to finds one can presume that there were many different kinds of craftsmen among the Scordisci – blacksmiths, silversmiths, carpenters, potters and tanners –, it is not always easy to recognize their graves as such, considering that good quality tools were appreciated and inherited, either within a family or within a workshop. Also it seems that apart from their everyday activities, craftsmen were also warriors when needed, since in some graves with tools there were also weapons as, in the Karaburma graves 31 and 50. At this stage, it is difficult to conclude whether Scordiscian craftsmen were recognized as a special social group, or apart from the usual 'warrior's duty', they also possessed some craft skills.

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List of figures

Fig. 1. Karaburma. The location of the site.

Fig. 2. Tools in the cemetery of Karaburma. 1. Grave 31; 2. Grave 50; 3–4. Grave 104; 5. Isolated find.

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Production and Circulation of La Tène Painted Pottery North of the Lower Danube

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Keywords: painted pottery, pottery production, mobility, interaction, local taste

Painted pottery has been for a long time a subject for archaeological studies on the Late Iron Age north of the Lower Danube, especially owing to their particular ornamentation that distinguishes them amongst pottery assemblages. Many of the finds have thus been already published. However, their acknowledged particularity has only rarely resulted in a thorough description which has often been brief and poorly illustrated whereas some finds have been hardly mentioned at all. The first paper concerned entirely with the painted pottery produced and used in the later part of the Late Iron Age north of the Lower Danube was published more than a decade ago (Florea 1998). This study was focused on the pottery known as 'Dacian painted pottery', which by its decoration and production characteristics is distinct from the painted pottery produced in Western and Central Europe in the so-called 'La Tène style'. Nevertheless, the paper also described La Tène painted pottery, using both published and new information. Not much new data has occurred since, yet new contributions have been possible based on the primary publications and the direct analysis of the unpublished finds from Divici–*Grad*. Even though this paper does not increase significantly the list of finds, it reconsiders in more detail the issues of production and distribution of La Tène painted pottery north of the Lower Danube. The subject cannot be isolated from 'Dacian painted pottery' as an expression of the developments that took place in production and taste.

Both 'La Tène' and 'Dacian painted pottery' are generic terms describing finds from large geographical areas associated with each of the two cultural groups. Despite the existence of shared technological and decorative features that define each group, there are many regional developments masked by the 'La Tène' or 'Dacian' labels. La Tène painted pottery is described by two ornamental styles used respectively in Western and Central Europe.[1] These, apart from similarities, display to a certain degree different stylistic features. The earliest finds have been traced to the LT C2 chronological phase, when painted pottery reappears in Western Europe and soon spreads towards east in the areas defined by La Tène material culture (Pl. 1/1), becoming at the same time one of its 'trademarks' (Maïer 1970, 145–163; Hautvillers 1991, 289–294).

Decoration is not uniform everywhere, yet some general elements can be observed, such as a preference towards painting elongated and globular shapes.[2] The decoration has at its basis the combination

1 Hereafter referred to as the Western and Eastern La Tène styles.

2 The pottery painted in the 'La Tène style' has already been the subject of numerous papers describing the finds on a site or on a regional level. The broad developments have been observed using this vast literature, amongst which may be mentioned the more general studies of Fr. Maïer (1970) and the conference held at Hautvillers in 1987 (Hautvillers 1991).

Iron Age Crafts and Craftsmen in the Carpathian Basin, 2014, p. 301–318

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of lighter and darker shades of white and red colour. The simplest ornamentation uses alternate stripes of these contrasting tones, usually having the lighter shade as coating, sometimes in combination with unpainted areas. More rarely geometric, stylized vegetal or animal depictions are applied onto this background, mainly in a darker shade (grey/sepia on white, claret/brown on red). Unlike the frequent use of vegetal and animal stylized representations in Western Europe (Pl. 1/2A), the Eastern La Tène style is characterized by the almost exclusive use of geometric patterns – a fairly small amount of vegetal and animal depictions have been recorded at Manching (Maïer 1970, 60–62, T. 86–91); and even fewer elsewhere: Stradonice (Břeň 1973, 150, T. IX/; Bónis 1969, Abb. 6/12; 30/1), Budapest–*Tabán* (Pl. 1/2D). At the same time, a more varied set of ware types was painted in the east.

The geometric motifs were usually drawn on the most visible part of the ware in a main decorative field organized in repetitive metopes (Maïer 1970, 42–43). Grids, zigzags, simple or grouped lines and ladder patterns were generally very popular. On a more detailed level some local combinations can be observed, such as the use of darker undulant lines painted on a lighter background, often framed by thinner undulant and straight lines, preponderantly in the territory identified with the tribe of the Eravisci (Pl. 1/2D1), at Békásmegyer (Hunyady 1942, 147, T. XCV/3; XCVIII/5); Budapest–*Tabán* and *Gellérthegy* (Bónis 1969, 170); Százhalombatta (Szabó 1991, 276, fig. 1) and rarely elsewhere: Devín, Polepy (Filip 1956, Tab. CIII/3; CXXIX/21); Nitrianski Hrádok (Točik 1959, 848, Obr. 323/2); a variant of the ornament was produced at Krivina, in Bulgaria (Vagalinski 2011, 223–224, fig. 5/11–14, 16–17; 7).

Likewise, motifs involving dots (Pl. 1/2D2) did not spread east from Moravia (Břeň 1973, 150). Other forms are characteristic of more restricted areas, such as a circle connected with the frames of a metope by zigzag and undulating lines found in southern Poland (Pl. 1/2D3) or the semicircle with zigzags in the same arrangement which occur at Gomolava (Pl. 1/2D4). On the contrary, although burnishing was considered to be another particular development of the production from Budapest and its surroundings – Békásmegyer (Hunyady 1942, 147, T. XCV/3; XCVIII/5); Budapest–*Tabán* and *Gellérthegy* (Bónis 1969, 170) –, the same technique was also applied at Gomolava (Jovanović–Jovanović 1988, T. IV/1, 5; XIII/1, 2, 4, 5, 9; XIV/3–7; XV/1–2, 4, 6, 8–11; XVI/2; XXII/2–4; XXX/11; XXXI/5; XL/1) and in southern Poland where microscopic analysis established that the lustrous aspect of the red shades was a result of the firing technique (Wirska-Parachoniak 1980, 158). Regional developments are detectable in the ware types as well. Lower ware such as bowls were generally less frequently painted and only rarely had geometric decoration (Bónis 1969, 169–170, with geometrical decoration: Abb. 64/3; Břeň 1973, T. I–XII; Jovanović–Jovanović 1988, 105, with geometrical decoration: T. XIV/7, 9, XXIV/7, XXXI/5a–b; Poleska 2011, fig. 2; 7; 8/3). During the Roman period the geometric patterns are replaced with animal and human figures framed by schematic vegetal motifs. They were continuing the technological traditions of La Tène painted pottery (Pl. 1/2B), but breaking away from its geometric aspect (Vágó 1960, 54–62; Jovanović–Jovanović 1988, T. XXII/5a–b).

The first pottery painted north of the lower Danube can be traced to the second century BC. Still, its largest production begins only in the next century. The finds come foremost from southern Moldavia and, in lesser frequency, from Wallachia and Transylvania. The decorations were applied on consumption ware such as beakers and bowls, but especially on the local *kantharoi* produced east of the Carpathian Mountains (Glodariu 1974, 41–42, 46, 143–144), further indicating the origin and bulk of the production in this area. They were usually decorated with straight or undulating lines and zigzags, but triangles were also frequent (Pl. 1/2E) – many of the types are known only at Brad. Apart from these examples particular features have been identified only at Ocnița (Pl. 1/2E2), Poiana (Pl. 1/2E3) and Cândești (Pl. 1/2E4). In the Orăștie Mountains painted pottery is not only stylistically distinct but also had a later chronological development having its beginnings in the first century AD. Here, unlike pottery with geometric decoration, tall vessels were preferred, whereas consumption ware was less commonly painted. Furthermore, ornamentation had a very specific aspect, focusing around animal and vegetal motifs (Pl. 1/2C). Both the 'Dacian painted pottery' and that produced in the Orăștie Mountains used a similar painting technique, at the same time resembling La Tène style. Decoration was in red shades applied on a white slip or in some cases directly on the unpainted surface. Black colour was rarely used and it should not be considered a widespread feature of the 'Dacian painted pottery'. Unlike La Tène painted pottery the firing was oxidizing or reducing, conferring together with the diversity of clays a varied trait

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to the 'Dacian painted pottery' even as represented on the same site (Florea 1998).[3] Although La Tène and 'Dacian painting techniques' to a certain degree resemble each other, the individual nature of the products is normally obvious.

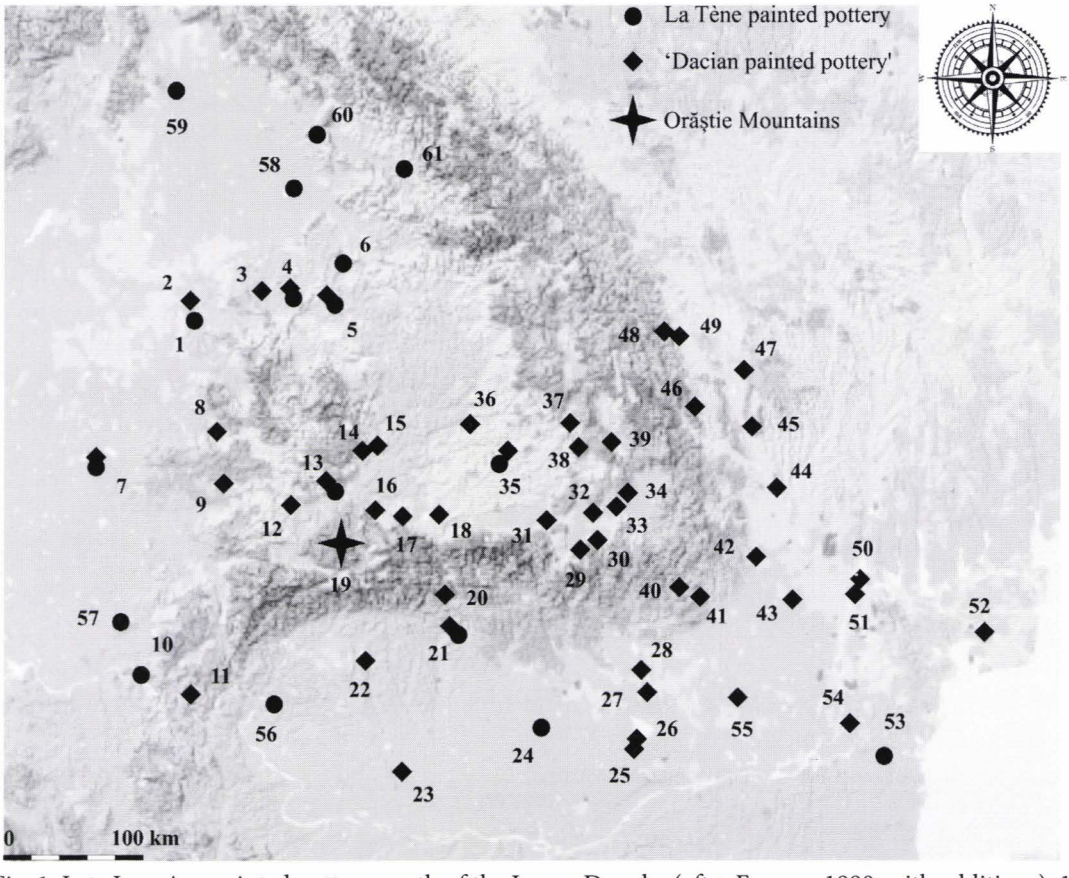

Fig. 1. Late Iron Age painted pottery north of the Lower Danube (after Florea 1998, with additions). 1. Oradea (BH); 2. Biharia (BH); 3. Marca (SJ); 4. Şimleu Silvaniei (SJ); 5. *Măgura Moigradului* (SJ); 6. Cheud (SJ); 7. Pecica (AR); 8. Berindia (AR); 9. Săvârşin (AR); 10. Divici–*Grad* (CS); 11. *Stenca Liubcovei* (CS); 12. Cozia (HD); 13. Ardeu (HD); 14. Piatra Craivii (AB); 15. Cetea (AB); 16. Căpâlna (AB); 17. Tilişca (SB); 18. Guşteriţa (SB); 19. Orăştie Mountains (HD); 20. Cozia Veche (VL); 21. Ocniţa (VL); 22. Socu-Bărbăteşti (GJ); 23. Bâzdâna (DJ); 24. Popeşti (AG); 25. Popeşti (GR); 26. Bucureşti–*Bragadiru* (IF); 27. Vlădiceasca (IF); 28. Tinosu (PH); 29. Râşnov (BV); 30. Braşov–*Pietrele lui Solomon* (BV); 31. Şinca Veche (BV); 32. Feldioara? (BV); 33. Sfântul Gheorghe–*Bedeháza* (CV); 34. Covasna (CV); 35. Sighişoara–*Wietenbergi* (MS); 36. Bernadea (MS); 37. Zetea (HR); 38. Mereşti (HR); 39. Porumbenii Mari (HR); 40. Sibiciu de Sus (BZ); 41. Târcov (BZ); 42. Cândeşti (VN); 43. Grădiştea (BR); 44 Poiana (GL); 45. Răcătău (BC); 46. Moineşti (BC); 47. Brad (BC); 48. Piatra Neamţ–*Bâtca Doamnei* (NT); 49. Piatra Neamţ–*Cozla* (NT); 50. Barboşi (GL); 51. Brăiliţa (BR); 52. Ghiolul Pietrei (TL); 53. Satu Nou–*Valea lui Voicu* (CT); 54. Bordușani (IL); 55. *Piscu Crăsani* (IL); 56. Mala Vrbica–*Ajmana*; 57. Židovar; 58. Lazuri (SM); 59. Zemplín; 60. Malaja Kopanja; 61. Solotvino–*Cetate*.

Not many of the fragments found north of the Lower Danube that were painted in La Tène style have been properly described (Fig. 1). Nevertheless, it can be recognized that the alternance of white and red stripes is preponderant (Pl. 2/1–7, 10–11; 4/1–2, 5–6, 8–10; 6/1–4, 12–13, 15–17): Măgura Moigradului (Florea 1998, 57, pl. 35/2); Şimleu Silvaniei (Florea 1998, 57–58, pl. 35/1, 5, 6); Popeşti (Berciu 1966, fig. 9; Florea 1998, 60–61, pl. 34/3); Pecica (Crişan 1969, fig. 109; Crişan 1978, 153–154, pl. 99/4, 5; 144/1; Florea 1998, 59, pl. 33/2–3); Cheud (Pop 2011, 317, pl. 5/8–9); Sighişoara–*Wietenberg* (Florea 1997, 94–95, fig. 89/1); Ardeu (Ferencz 2013, pl. V); Divici–*Grad*, Malaja Kopanja (Kotigoroško 1995, 87, fig. 45/26–34; Kotigoroško *et al.* 2009, photo 10); Zemplín (Benadik 1965, 79, Abb. 8, 9; Kotigoroško 1995, 87, fig. 45/26–34); Solotvino–*Cetate* (Rustoiu 2002, 69, fig. 111/6–8); Lazuri (Florea 1998, 56). Seldom, other combinations of colours are used, such as black and red at Divici–*Grad* (Pl. 4/3) and

3 Florea describes two decorative systems within Dacia: one widespread, with focus in eastern Romania (only few finds are from sites outside this area), the other restricted around Sarmizegetusa Regia.

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purple brown or gray and white at Malaja Kopanja (Pl. 6/2, 3, 6) (Kotigoroško *et al.* 2009, photo 10). The geometric decoration is applied on a smaller number of finds. One fragment from Șimleu Silvaniei (Pl. 2/9) still preserves the grid ornament, probably painted in sepia (Florea 1998, 58, pl. 35/3). The grid is also painted on several pieces from Zemplín (Pl. 6/8–10, 14) (Benadik 1965, Abb. 8, 9), displayed in rectangular shapes applied on a white or red background. They have parallels on almost every site where geometric decorations were employed. However, it appears that in Gomolava or Budapest the grids were organized in rhombic or, covering a larger surface, in triangular shapes, whereas rectangles are uncommon (Bónis 1969, Abb. 15/23; 40/28; 98/3; Jovanović–Jovanović 1988, T. XIII/4). The latter are more frequent in regions closer to the Tisza valley, in Southern Poland (Poleska 2011, fig. 2/3, 5, 12, 13; 7/1, 4, 6, 11, 20, 22), Slovakia (Pieta 1996, Taf. VII/13, 16) and Bohemia (Pič 1906, pl. XLIX; Břeň 1973). The publication of two finds from Ghiolul Pietrei describes a white coating polished 'in grid'. However, the quality of the image does not allow any observations on the shape of the grid (Lungu 1991, 64, pl. V/9).[4]

At Divici–*Grad* the grids are depicted in rhombic shapes assembled in various patterns. The analysis of the pottery from this site considerably increased the number of La Tène painted pottery finds, which are now the most numerous known north of the Lower Danube. Due to their previous more thorough description (Drăgan 2013), only the most important elements will be pointed out. The decorative system is based on the alternating of red and white stripes, where the latter is the slip covering the ware. At least in three cases the ware was painted only on its upper half (Pl. 4/4, 5, 9). Black and brown were each used one time (Pl. 4/3; 5/6). Except for the brown paint, used as a base colour (Pl. 5/6), and on a few other cases (Pl. 4/4, 6–7) the colour was burnished. Geometric patterns were painted onto this background, always in the same base colour as their background, namely lighter or darker sepia on a white shade or dark red on red. The groups of vertical bars were painted on red (Pl. 5/6, 7), whereas sepia horizontal and diagonal lines, ladder patterns and rhombic grids were painted on the white ground colour (Pl. 4/7; 5/1–5, 7). A large bowl preserves almost its entire decoration, hence providing more elements for the interpretation of the geometric patterns. The main ornamentation field was painted on the lower half of the vessel in repetitive metopes containing symmetrical rhomboid shaped grids that depict unique stylized elements resembling wings (Pl. 5/7) or flippers.

The particular arrangement of rhombic grids in a vertical row can be limited to Manching (Maïer 1970, T. 83), Bohemia (Pl. 5/11, 12) (Břeň 1973, T. VI/7; VIII/1–3; XI/6, 7) and southern Poland (Pl. 5/8) (Poleska 2011, fig. 2/21), given that the pattern is missing in the area of Budapest (see Bónis 1969) and Gomolava (see Jovanović–Jovanović 1988). Furthermore, the depiction of the rhomboids within the metopes of the bowl from Divici–*Grad* is almost identical to another find from Southern Poland (Pl. 5/8) (Poleska 2011, fig. 7/6, combined with a line of rhombs, see also fig. 7/13). Another group of sherds from Divici–*Grad*, all found in one building (house L1/1985), are distinct from the rest of the finds (Pl. 4/4, 6–7) by their decoration, fabric and firing technique. Firstly, the lines that form part of a grid or ladder pattern are thinner and slightly undulating, pointing to a different painting technique from the other finds, where the patterns were applied using a pattern cut from leather (Pl. 4/7). Secondly, the undulating line that can be observed on another sherd has closer parallels in Budapest, given that isolated curvilinear models are generally unknown elsewhere in the Eastern La Tène area (Pl. 4/11–12) (Bónis 1969, Abb. 6/12; 7/6; 26/5; 98/3). Lastly, the finds from L1/1985 were produced using distinctly more porous clay fired in an oxidizing atmosphere which confirms that they belong to a different production set.

Other well-preserved geometric motifs have been identified further east, at Ocnița (Pl. 3/1, 2) (Berciu 1981, 106, pl. 76/1, 119/3). At least two examples can be identified as belonging to La Tène painting style. Their decoration using only lines and zigzags arranged in different patterns is unusual as compared to that known from the rest of the sites north of the Lower Danube, where grid or ladder motifs are common. However, they are very similar to the patterns from southern Poland (Pl. 3/6, 7) (Poleska 2011, fig. 7) and the recently published finds from Židovar and Rospi Čuprija (Pl. 3/5) (Sladić 2009, fig. 11) or Páty (Ottományi 2005, 18/1 kép). Two other pieces from Ocniţa have been decorated with similar patterns, but the lack of details regarding production and decorative techniques hinders further comparison (Pl. 3/3, 4) (Berciu 1981, pl. 82/6; 118/3). One of them has been painted with a rhomboid

4 Another fragment from Borduşani was painted with a grid pattern and differently oriented zigzags, but due to the lack of a detailed description its relationship to 'La Tène style' is based only on the triangular shape of the grid uncommon on 'Dacian painted pottery'.

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grid and other angular lines, having no clear parallels (Pl. 3/4). Lastly, one sherd from Satu Nou–*Valea lui Voicu*, far from the production centers of Central Europe, was decorated with a horizontal zigzag framed by two stripes, placed above a partially preserved motif (Pl. 2/8) (Irimia-Conovici 1989, 129, fig. 21). Whereas the upper ornament is similar to a find from Divici–*Grad* (Pl. 5/3) and Kraków (Pl. 5/10) (Woźniak 1990, T. XIII/e), the incomplete motif below could not be properly identified. A bowl from Marca with rim painted in black was excluded from this study. Even though the decoration technique was also common to La Tène ceramic development during its later phases (see Meduna 1980, 105–106), the decorative concept is different from the white and red painting.

In a few cases – Sighișoara–*Wietenberg* (Florea 1997, 94), Șimleu Silvaniei, Măgura Moigradului (Florea 1998, 57–58), Ardeu, Divici–*Grad*, Solotvino–*Cetate* (Rustoiu 2002, 69) – the fabric has been described in detail, hence it can be established that the pottery had a gray core with light brown outer rims, as a result of the inicial reducing firing of the ware. The same characteristics are met on several sites in Europe, such as Manching (Maïer 1970, 67), Bohemia (Břeň 1973, Tab. VI/6; X/1), southern Poland (Wirska-Parachoniak 1980, 158) and Budapest (Bónis 1969, 167–174). A number of finds coming from House L1/1985 from Divici–*Grad* were fired in an oxidizing atmosphere. The ware shapes north of the Lower Danube are the same as those painted across Europe. Some of them were very popular, such as the flagons – Popești (Pl. 2/5), Ocnița (Pl. 3/1), Malaja Kopanja (Pl. 6/6) –, pots with everted rim – Divici–*Grad* (Pl. 4/8–10); Șimleu Silvaniei (Pl. 2/3) and Ocnița (Pl. 3/2) – or pottery that resembles storage ware – Șimleul Silvaniei (Pl. 2/4), Pecica (Pl. 2/6–7), see also Gomolava (Jovanović–Jovanović 1988, 10, drawing 1d, T. 4/3, 14/8, 15/7; Dautova-Ruševljan–Brukner 1992, T. 15/102), Budapest (Bónis 1969, Abb. 88/20; 89/29); Páty (Ottományi 2005, 18/1 kép), Southern Poland (Poleska 2011, fig. 2/22). Shallow shapes are represented by the bowls from Zemplín (Pl. 6/8–10), Măgura Moigradului (Pl. 2/1), Șimleu Silvaniei (Pl. 2/2) and Divici–*Grad* (Pl. 5/7). Both finds from Măgura Moigradului and Divici-Grad resemble the Roanne type bowls, developed as a Roman provincial form at the end of the first century BC in Gaul, and whose painting is common over a large area from Gaul to Budapest (Bónis 1969, Abb. 30/15–17; 99/1, 4; Břeň 1973, Tab. III/5–7; IV/6, 7, 9–14; VI; Woźniak 1990, 118–119; Grand 1995, 179–180). The bowls identified north of the Lower Danube have an angular shoulder with only parallels within Eastern La Tène painted pottery from Kraków (Pl. 5/9) (Poleska 2011, fig. 2/18) and in Roman Gomolava (Dautova-Ruševljan–Brukner 1992, T. 15/99).

Another form from Șimleu Silvaniei was less frequently painted, but similar examples are known from Kraków (Poleska 2011, fig. 2/20), Stradonice (Břeň 1973, T. V/5–7), Budapest (Bónis 1969, Abb. 62/13, 15; 104/23) and especially Gomolava (Jovanović–Jovanović 1988, T. 4/1, 4, 6; 14/5; 15/1–3; 24/7; 32/3; 37/1). Likewise, lids like one from Divici–*Grad* (Pl. 5/6) were rarely painted in the 'La Tène style' (Maïer 1970, T. 19/427–429; 92/1253; Břeň 1973, T. V/8, 9, 15; Poleska 2011, fig. 2/23). Certain shapes are not known in the Eastern La Tène painted pottery, such as two beakers from Ocnița (Pl. 3/3) and Malaja Kopanja (Pl. 6/7) which belong to the local pottery developments north of the Lower Danube (Crișan 1969, 117–124, 173–178). More rarely these have two handles or the handle assembled from two or more rolls of clay like at Ocnița (Trohani 1999). The cups from Malaja Kopanja (Pl. 6/1–4) also distinguish themselves by their shape and careless working. Similar painted ware is known from Stradonice (Břeň 1973, T. II/3), Solotvino–*Cetate* (Pl. 6/16–17) and possibly Kraków (Poleska 2011, fig. 2/20). It is unclear whether a fragment from Divici–*Grad* (Pl. 4/6) should be considered part of a 'chalice' or jar or of a bowl with a tall foot. So far there are no bowls with a tall foot of this type painted in 'La Tène style'. On the other hand, 'chalices' are characteristic for Poland and Slovakia, with the only exception from Esztergom in Hungary (Cumberpatch 1993a, 64).

Not many finds north of the Lower Danube have been chronologically ascribed within a clear context. Where this was possible, it proves the use of 'La Tène style' painted pottery beginning with the first century BC, but mostly in the first century AD; examples are Șimleu Silvaniei, first century AD (Florea 1998, 58), Divici–*Grad*, first century BC and especially first century AD (Drăgan 2013), Ocnița[5] and Satu Nou–*Valea lui Voicu*, second half of the first century BC–beginning of the first century AD (Irimia–Conovici 1989, 120).

5 One fragment was found in the pit no. 19 from the fortified area together with a fibula type in use from the second half of the first century BC until the beginning of the first century AD (see Berciu 1981, 78, pl. 71/3; 76/1; corrected by Rustoiu 1997, 48).

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Despite the small number of sites where La Tène painted pottery has been found (Fig. 1), certain geographical patterns can be defined. Most of the finds are grouped in Western Romania in settlements neighbouring the areas where a larger production and use of La Tène painted pottery is known, namely Hungary, southern Poland and central-eastern Serbia. A number of finds cluster around Şimleu Silvaniei in north-western Romania, especially in Şimleu Silvaniei, which is also one of the better researched sites in the region (Pop *et al.* 2006). Elsewhere, sites having La Tène painted pottery are geographically isolated from each other. Very few pieces have been found in the west, only at Pecica but their number is significantly larger at Divici–*Grad* further to the south. In the latter case, the ware was painted either with simple or more elaborate decoration, illustrating also various fabrics and firing. The conclusion of the ongoing pottery analysis will certainly enrich the list of finds, as it has already been indicated by the existing documentation.

The painted pottery from the right bank of the Iron Gates area, in the cemetery of Mala Vrbica–*Ajmana* (Stalio 1986, fig. 37), and that from the fortified settlement of Židovar (Sladić 2009, fig. 11) should also be connected to the sites from western and south-western Romania. However, the nature of the interaction between these locations and the sites from Romania in the Late Iron Age, largely proven by the archaeological material, is still to be fully comprehended from the perspective of social and political identity (Popović 2000, 95, 97; Jevtić–Ljuština 2008, 29–30; Drăgan 2012). In southern and eastern Romania the number of finds is very small, confirming the impact that distance had on their distribution.

Except for Oradea, Lazuri and Divici–*Grad* La Tène painted pottery was found together with 'Dacian painted pottery', illustrating the taste for this type of ornamentation (Florea 1998, 65–79, with list of sites with 'Dacian painted pottery'). The demand for such products is even more significant in the areas distant from the main production centres of La Tène painted pottery (Fig. 2). Equally important could be the absence of La Tène painted pottery from the fortified settlement of *Stenca Liubcovei* in the vicinity of Divici–*Grad*, where the 'Dacian painting style' is represented (Gumă 1977, 95, pl. XVIII). The distinct patterns in the Iron Gates micro-region are a good example of the variations developed within restricted areas in the use of certain products, pointing out the importance of taste, especially when it comes to decoration.

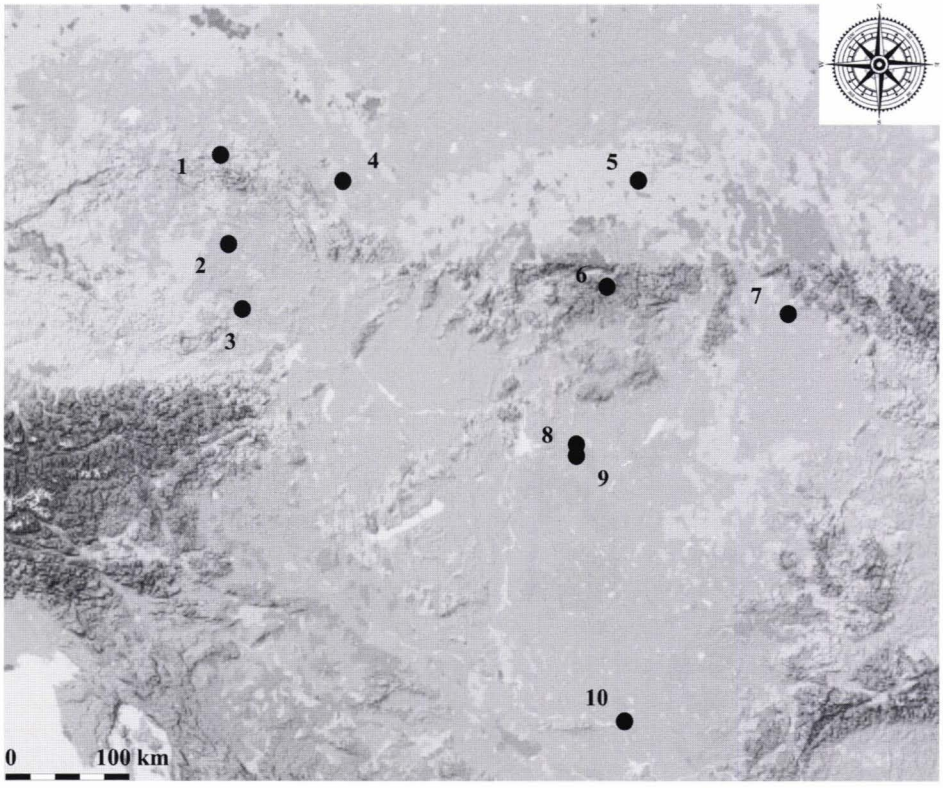

Fig. 2. Eastern La Tène painted pottery production sites. 1. Stradonice (Kladno); 2. Nevěžice (Písek); 3. Třísov (Český Krumlov); 4. Staré Hradisko (Prostějov); 5. Kraków; 6. Liptovská Mara (Liptov); 7. Zemplín (Trebišov); 8. Békásmegyer; 9. Budapest– *Gellérthegy*, *Tabán*; 10. Gomolava (Ruma).

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The insight into older as well as more recent painted pottery finds north of the lower Danube reflect general technological and decorative links with the pottery produced and used in the Eastern La Tène area. Above all, the ornamentation and firing relate to Central Europe and especially southern Poland and to a lesser degree to the Central-Eastern Serbian finds. On the other hand, the structure of the geometric ornament and some pottery forms reflect particular choices, even originality. It was often difficult to clearly establish the stylistic source. The replacement of the pre-Roman geometric ornament with markedly different patterns during early Roman times also creates some questions concerning the use of La Tène painted pottery in the first century AD.

Furthermore, the mechanisms of production and distribution of La Tène painted pottery are not fully understood in general. To a significant length the situation is created by the existence of a quite uniform stylistic concept widely distributed, having only few distinctions that can be assigned to more restricted areas. The production technology, including a high refinement of the clays, allowed but limited petrographic results on a regional level and when distinctions could be made, they applied only for a few sites that have enjoyed larger archaeological interest, therefore providing the largest samples. Smaller sets of finds could not thus be determined. Unavoidably, production was associated with the former. Direct proof of production is rather scarce though (Břeň 1973, 150). On some sites it was indicated by pottery kilns that could also produce painted pottery: Békásmegyer (Hunyady 1942; Nagy 1942, 1. kép), Zemplín (Benadik 1965, 72), Budapest (Bónis 1969, 211–212), Gomolava (Jovanović–Jovanović 1988, 92–97, 195, Pr. 10; Sl. 21–22, 25), Liptovská Mara (Pieta 1996, 56–59), Kraków–*Podłęże* (Poleska 2011) and more rarely by production waste: Kraków–*Krzesławice*, Kraków–*Pleszów* (Poleska 2011, 49). In the settlement of Budapest–*Tabán* three painted vessels stamped with a gemstone with the figure of Victory, interpreted as a potter's mark, are of a considerably better quality and distinct geometric decoration from the rest of the pottery, illustrating the highest degree of specialization in the production of La Tène painted pottery known to date (Bónis 1969, 173–174).

Comparative petrographic studies on painted pottery are available for Moravia and Bohemia (Cumberpatch 1993b), Slovakia, southern Poland and Transdanubia (Cumberpatch 1993a), as well as for Southern Poland (Wirska-Parachoniak 1980). These proved the existence of distinct petrographic groups which, although not markedly individualized due to the high refinement of the clay, confirmed the archaeological results regarding production centers. Thus, the identified clusters of similar clay composition indicated that in Slovakia, Bohemia and Moravia painted pottery was produced in a limited number of larger sites, the same where the biggest collections of painted pottery were found – Liptovská Mara, Zemplín, Stradonice, Staré Hradisko, Třísov and Nevězice (Cumberpatch 1993a, 76–80; Cumberpatch 1993b, 75–76). On the contrary, around Kraków, apart from a large group of painted pottery with the same clay composition, there is a number of finds with markedly different clay fabrics which evidence the existence of multiple smaller sources (potters or workshops) (Wirska-Parachoniak 1980). They show a separate pattern from the concentrated production and distribution model from other areas (Poleska 2011, 51–52). The petrographic groups have also been verified through the degree of typological preference (Cumberpatch 1993a, 80; Poleska 2011, 52), which suggested a mainly local and regional distribution. Even the 'exotic' types of ware which appear on several sites do not reveal a petrographic dissimilarity and therefore could not be regarded as evidence of the presence of imports. The combined archaeological and petrographic analyses are a useful instrument for the understanding of the mechanisms of distribution of La Tène painted pottery. They contribute to our view of the circulation of technology and motifs, encouraging the consideration that people and, together with them, ideas had a larger degree mobility over large distances rather than that ceramic products were actually transported over large distances in a regular manner, although limited distributions should not be dismissed.

The varied aspect of the finds north of the Lower Danube and the uniqueness of the decorative combinations encountered perhaps can be better understood when one accepts the importance of technology sharing over product mobility. The significance painted pottery had for its users on different sites stands primarily behind its production or purchasing, a fact that has contributed to local and regional varieties. At Divici–*Grad* the painted pottery was mainly found inside the most complex architectural structures of the settlement. The question in this case, and for that matter generally, is whether painted pottery should be interpreted as a means of prestige representation and if so, how; is it its particular

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display that was foremost considered at its acquisition; or maybe specific beliefs stood behind the selection? Of course, aesthetics, functionality and spirituality do not exclude each other. To start with, the importance of functionality and spiritual background should be observed in the distribution between graves and settlements. Because of the funerary developments contemporaneous to the production of painted pottery, the only relevant example in the region is that of the Scordiscan territory. Here, although painted pottery is found both in settlements and in graves, in the latter the number is much reduced (Todorović 1972, T. I: Grob 1/4; XXIX: Grob 96/1; XXXVIII: Grob 203/2; XL: Grob 228/2). Furthermore, in the graves the paint was applied more or less in a similar manner on the same type of ware – Osijek (Todorović 1968, T. XIX/ 4), Mala Vrbica – *Ajmana* (Stalio 1986, fig. 37) – and the decoration was simple, using alternate coloured zones, whereas the geometric or stylized motifs found in the settlements are absent.

Thus, funerary finds neither compare to the large number of painted pottery recovered from the settlement of Gomolava, nor to their larger variety of shapes and decorations (Jovanović–Jovanović 1988). On the left bank of the Iron Gates, graves contain but little pottery, none of which is painted (Drăgan 2012, 433). The preponderant occurrence within dwelling structures suggests that painted ware was purchased primarily for use. The funerary finds must also be related to their functionality in settlements, especially where they are part of a banquet set (Egri–Rustoiu 2009; Drăgan 2012). Their role in beverage consumption has already been claimed in Western Europe (Guichard 1994, 119–120; Loughton 2005, 157–158). Likewise, the Eastern La Tène area is characterized by the generalization of painting on a much diversified set of shapes, which are generally connected to the consumption of beverage, but also of food. Their use during consumption, when these items could be displayed for guests, additionally points to the acquisition of painted pottery as an aesthetic alternative to the normal domestic service.

The preponderant incidence of painted pottery within settlements which were distinctive in the landscape, particularly in the case of the developed geometric decoration system, argues for limited access. Although southern Poland has been regarded as an exception in that there is no obvious hierarchic structure of the settlements, this is probably due to the particular social background as reflected by the landscape in the area. It is perhaps noteworthy that 90% of the wheel-thrown pottery comes from only a few sites around Kraków, where also painted pottery is characteristic (Poleska 2011, 45–46). The percentages of painted pottery within settlements where studies are available show a reduced proportion of painted pottery within the entire ceramic assemblages (Bónis 1969, 168–169): Stradonice 4.01%, as compared to c. 16% of the fine pottery (Rybová–Drda 1994, 82), Kraków–*Podłęże* 12%, compared to 35.5% of the wheel-thrown ceramic (Woźniak 1990, 118). This verifies their limited use not only to certain settlements, but also within the latter. In the north of the lower Danube area these observations are important for the understanding of the acquisition process and of the social significance of La Tène painted pottery, given that distance from the main production centers would even more have restricted access to this type of pottery.

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List of figures

Fig. 1. Late Iron Age painted pottery north of the Lower Danube (after FLOREA 1998, with additions). 1. Oradea (BH); 2. Biharia (BH); 3. Marca (SJ); 4. Șimleu Silvaniei (SJ); 5. *Măgura Moigradului* (SJ); 6. Cheud (SJ); 7. Pecica (AR); 8. Berindia (AR); 9. Săvârșin (AR); 10. Divici–*Grad* (CS); 11. *Stenca Liubcovei* (CS); 12. Cozia (HD); 13. Ardeu (HD); 14. Piatra Craivii (AB); 15. Cetea (AB); 16. Căpâlna (AB); 17. Tilișca (SB); 18. Guștericța (SB); 19. Orăștie Mountains (HD); 20. Cozia Veche (VL); 21. Ocnița (VL); 22. Socu-Bărbătești (GJ); 23. Bâzdâna (DJ); 24. Popești (AG); 25. Popești (GR); 26. București–*Bragadiru* (IF); 27. Vlădiceasca (IF); 28. Tinosu (PH); 29. Râșnov (BV); 30. Brașov–*Pietrele lui Solomon* (BV); 31. Șinca Veche (BV); 32. Feldioara? (BV); 33. Sfântul Gheorghe–*Bedeháza* (CV); 34. Covasna (CV); 35. Sighișoara–*Wietenbergi* (MS); 36. Bernadea (MS); 37. Zetea (HR); 38. Merești (HR); 39. Porumbenii Mari (HR); 40. Sibiciu de Sus (BZ); 41. Târcov (BZ); 42. Cândești (VN); 43. Grădiștea (BR); 44 Poiana (GL); 45. Răcătău (BC); 46. Moinești (BC); 47. Brad (BC); 48. Piatra Neamț–*Bâtca Doamnei* (NT); 49. Piatra Neamț–*Cozla* (NT); 50. Barboși (GL); 51. Brăilița (BR); 52. Ghiolul Pietrei (TL); 53. Satu Nou–*Valea lui Voicu* (CT); 54. Bordușani (IL); 55. *Piscu Crăsani* (IL); 56. Mala Vrbica–*Ajmana*; 57. Židovar; 58. Lazuri (SM); 59. Zemplín; 60. Malaja Kopanja; 61. Solotvino–*Cetate*.

Fig. 2. Eastern La Tène painted pottery production sites. 1. Stradonice (Kladno); 2. Nevěžice (Písek); 3. Třísov (Český Krumlov); 4. Staré Hradisko (Prostějov); 5. Kraków; 6. Liptovská Mara (Liptov); 7. Zemplín (Trebišov); 8. Békásmegyer; 9. Budapest– *Gellérthegy*, *Tabán*; 10. Gomolava (Ruma).

List of plates

Pl. 1. 1. La Tène painted pottery in Europe (after MAÏER 1970); 2. The painted decoration of the pottery in the Late Iron Age and Early Roman time in Europe (after BÓNIS 1969 and FLOREA 1998).

Pl. 2. La Tène painted pottery from north of the Lower Danube. 1. Măgura Moigradului; 2–4, 9. Șimleu Silvaniei (after FLOREA 1998); 5. Popești (after BERCIU 1966); 6–7. Pecica (after CRIȘAN 1969; 1978); 8. Satu Nou–*Valea lui Voicu* (after IRIMIA–CONOVICI 1989); 10. Cheud (after POP 2011); 11. Sighișoara–*Wietenberg* (after FLOREA 1997).

Pl. 3. La Tène painted pottery from north of the Lower Danube. 1–5. Ocnița (after BERCIU 1981); 6. Židovar (after SLADIĆ 2009); 7–8. Kraków (redrawn after POLESKA 2011).

Pl. 4. La Tène painted pottery from north of the Lower Danube. 1–2. Ardeu (after FERENCZ 2013); 3–10. Divici–*Grad* – early tower-house T2 (3, 5); house L1/1985 (4, 6, 7); recent tower-house T2 (8–10); 11–12. Budapest–*Gellérthegy* (after BÓNIS 1969).

Pl. 5. La Tène painted pottery from north of the Lower Danube. 1–7. Divici–*Grad* – recent tower-house T1 (1, 3–7); stray find (2); 8–10. Kraków (redrawn after POLESKA 2011); 11–12. Stradonice (after BŘEŇ 1973).

Pl. 6. La Tène painted pottery from north of the Lower Danube. 1–6. Malaja Kopanja (after KOTIGOROŠKO *ET AL.* 2009); 7. Painted ware shapes from the Upper Tisa valley (after KOTIGOROŠKO 1995); 8–14. Zemplín (after BENADIK 1965); 15–17. Solotvino–*Cetate* (after RUSTOIU 2002).

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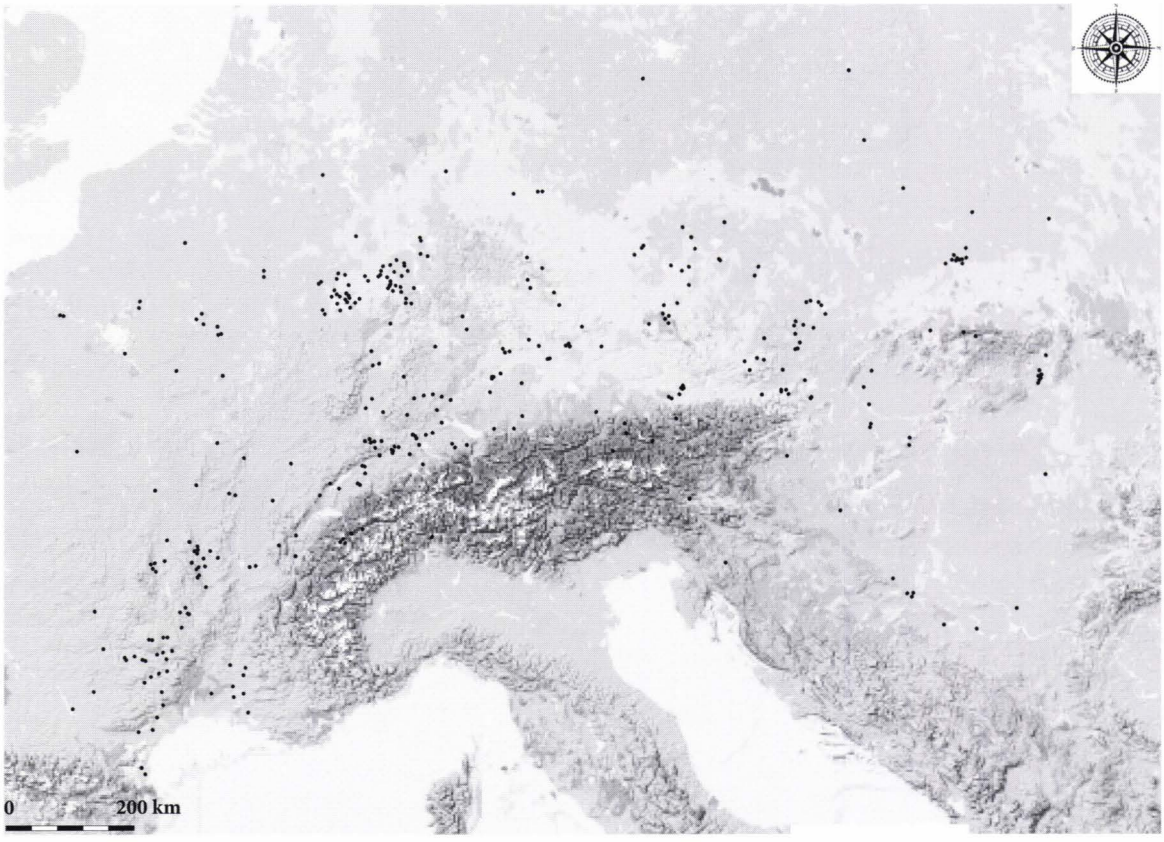

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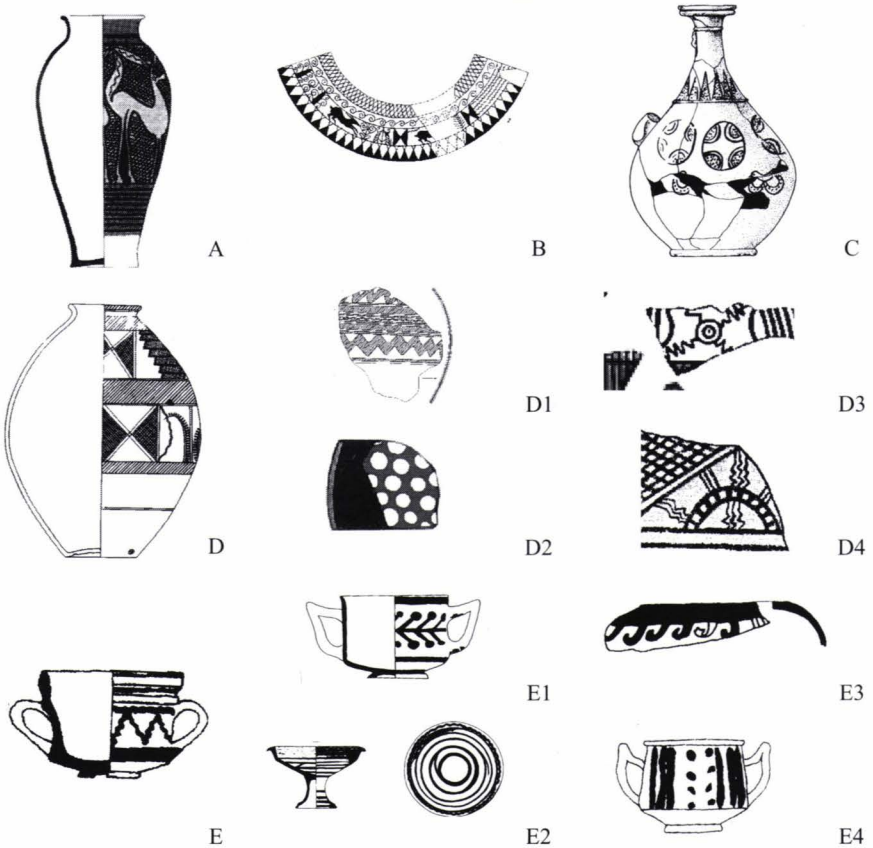

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Plate 1.1. La Tène painted pottery in Europe (after Maïer 1970);
2. The painted decoration of the pottery in the Late Iron Age and Early Roman time in Europe (after Bónis 1969 and Florea 1998).

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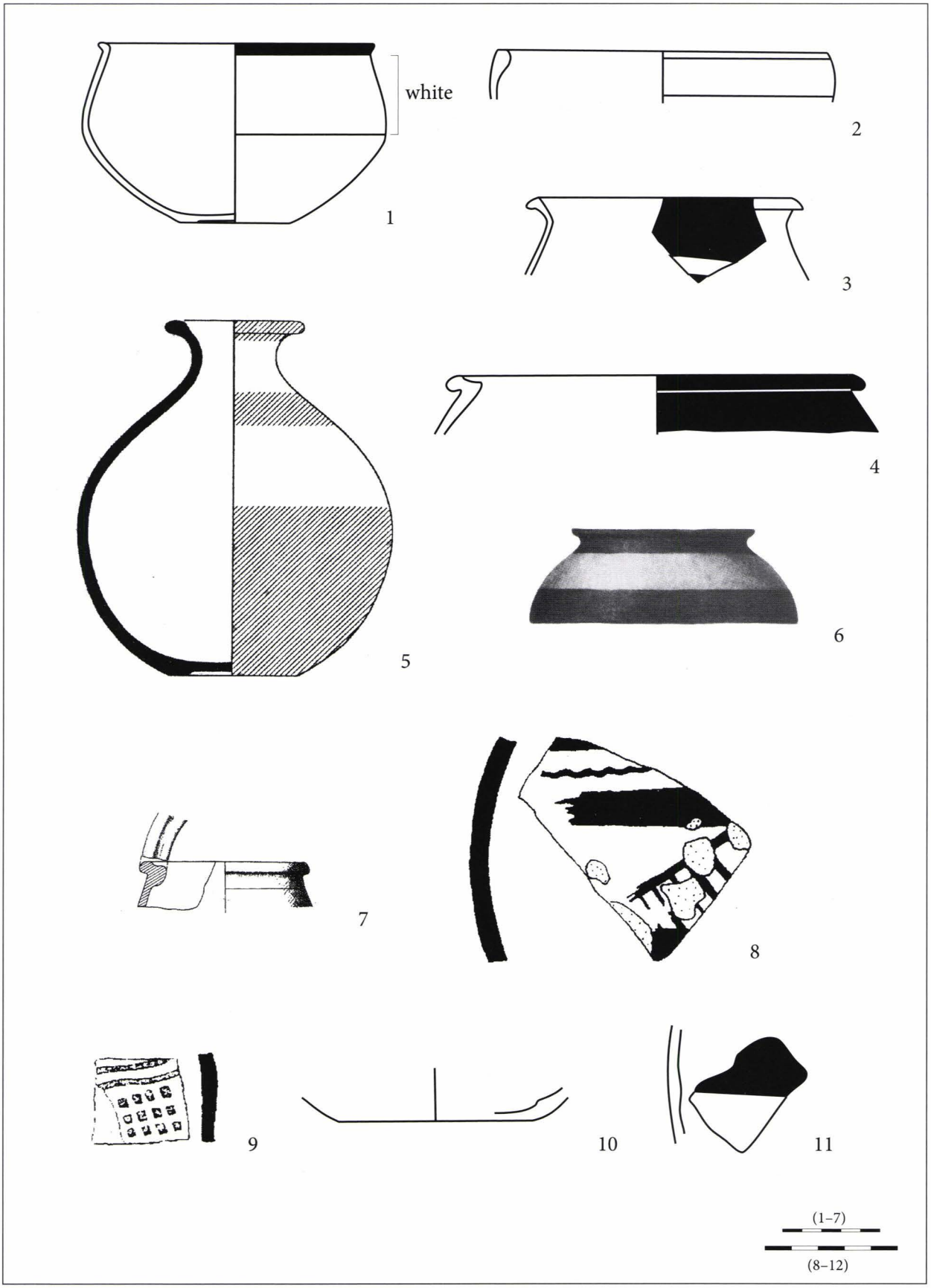

Plate 2. La Tène painted pottery from north of the Lower Danube. 1. Măgura Moigradului; 2–4, 9. Șimleu Silvaniei (after Florea 1998); 5. Popești (after Berciu 1966); 6–7. Pecica (after Crișan 1969; 1978); 8. Satu Nou–*Valea lui Voicu* (after Irimia–Conovici 1989); 10. Cheud (after Pop 2011); 11. Sighișoara–*Wietenberg* (after Florea 1997).

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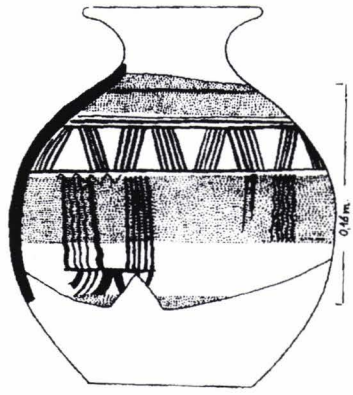

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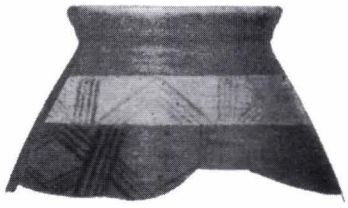

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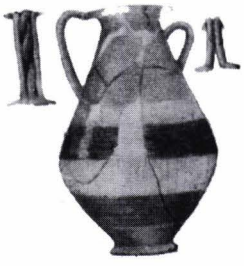

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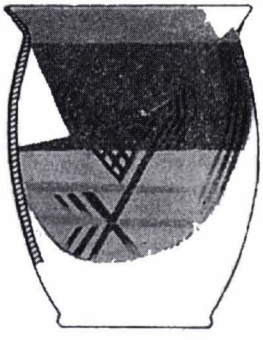

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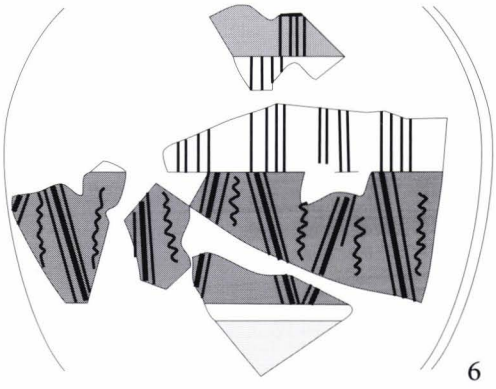

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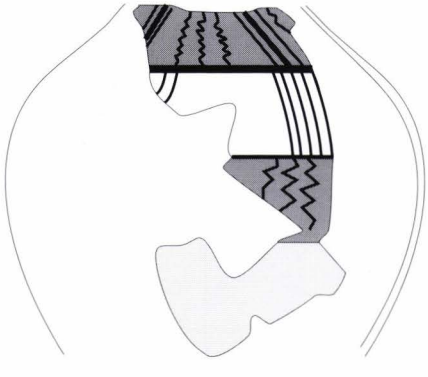

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Plate 3. La Tène painted pottery from north of the Lower Danube.
1–5. Ocnița (after Berciu 1981); 6. Židovar (after Sladić 2009); 7–8. Kraków (redrawn after Poleska 2011).

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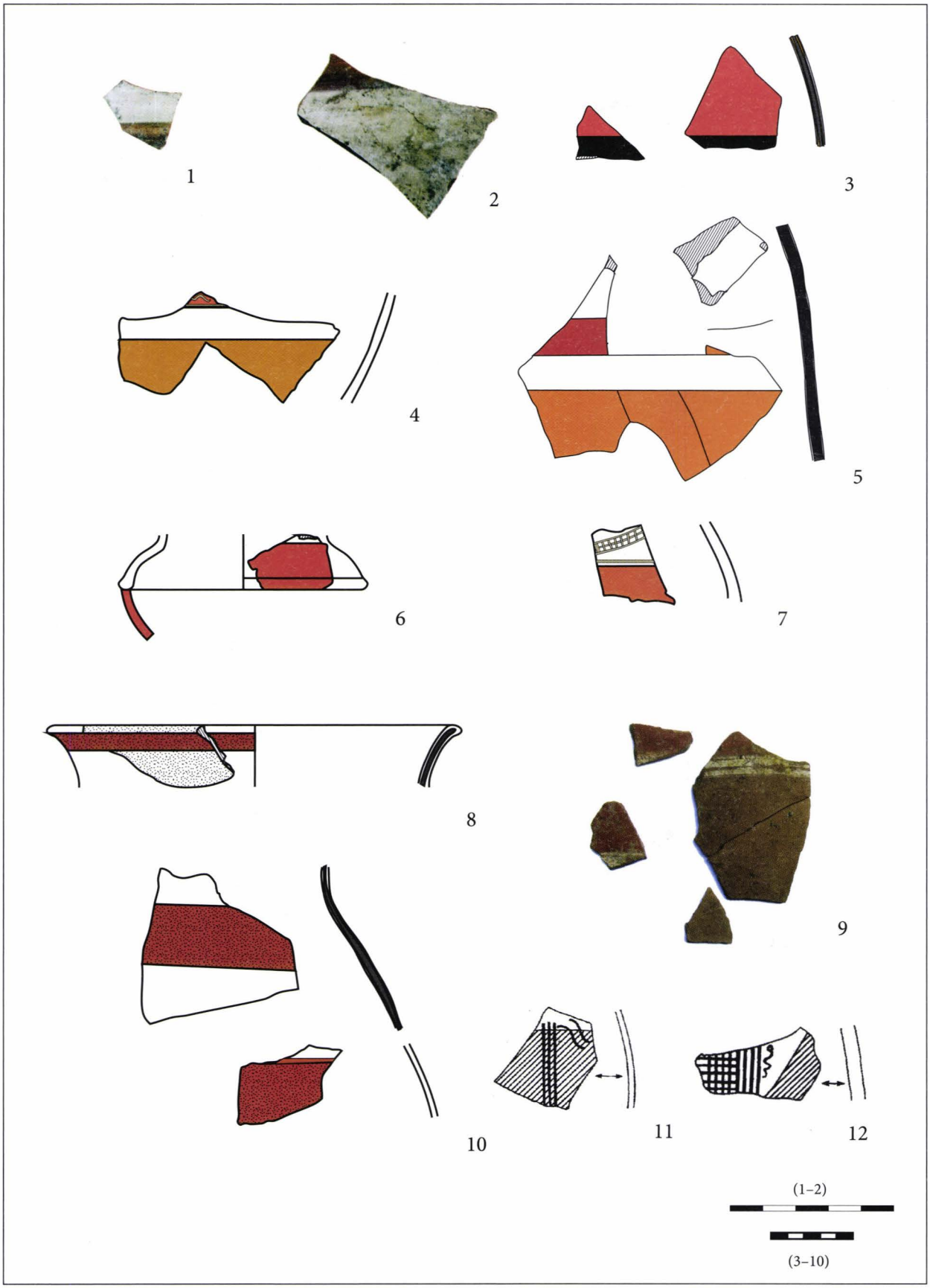

Plate 4. La Tène painted pottery from north of the Lower Danube.
1–2. Ardeu (after Ferencz 2013); 3–10. Divici–*Grad* – early tower-house T2 (3, 5); house L1/1985 (4, 6, 7); recent tower-house T2 (8–10); 11–12. Budapest–*Gellérthegy* (after Bónis 1969).

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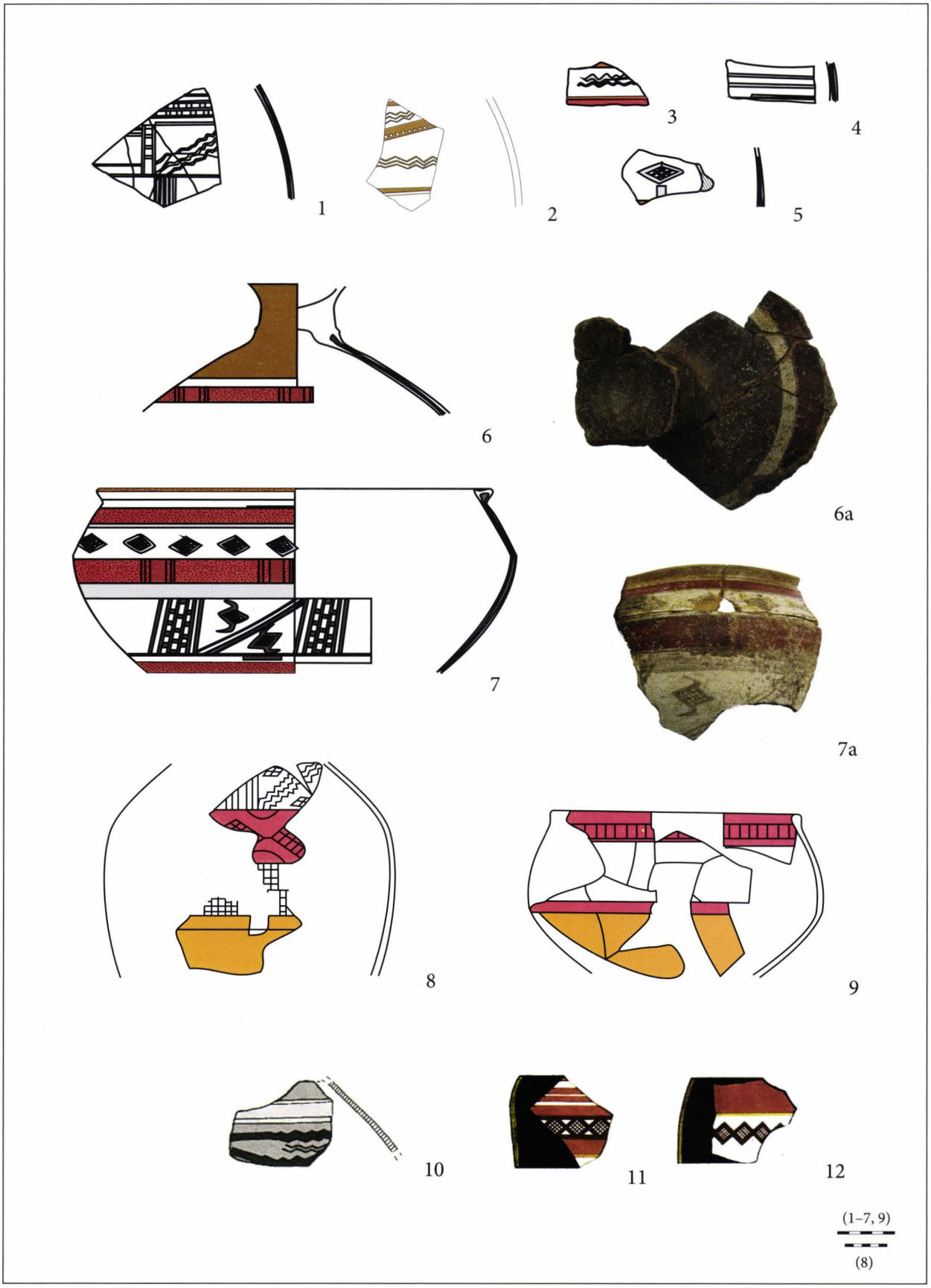

Plate 5. La Tène painted pottery from north of the Lower Danube.
1–7. Divici–*Grad* – recent tower-house T1 (1, 3–7); stray find (2);
8–10. Kraków (redrawn after Poleska 2011); 11–12. Stradonice (after Břeň 1973).

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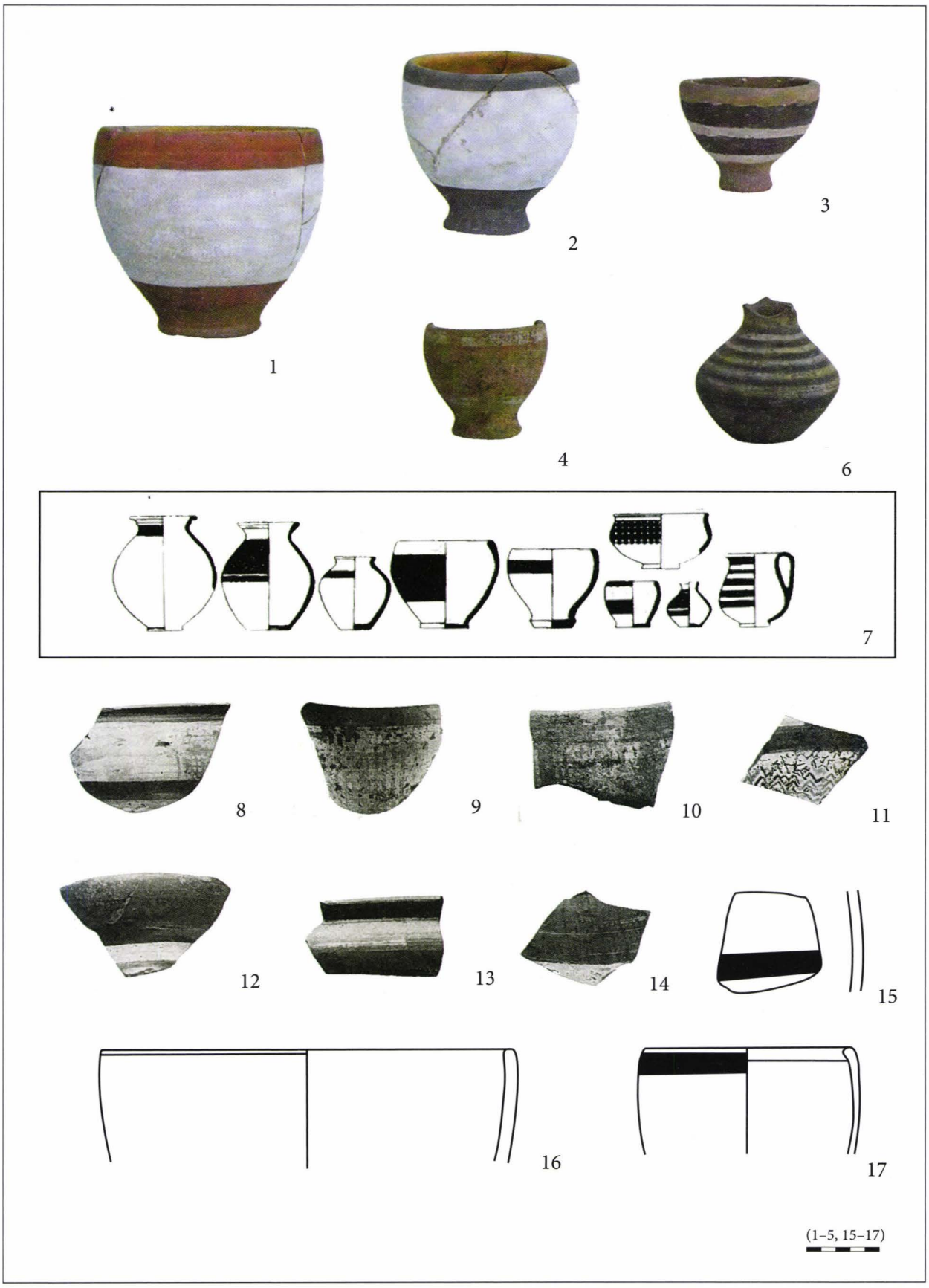

Plate 6. La Tène painted pottery from north of the Lower Danube. 1–6. Malaja Kopanja (after KOTIGOROŠKO *ET AL.* 2009); 7. Painted ware shapes from the Upper Tisa valley (after KOTIGOROŠKO 1995); 8–14. Zemplín (after BENADIK 1965); 15–17. Solotvino–*Cetate* (after RUSTOIU 2002).

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Hook, Lock, Furnace Rake or a Damaged Sickle for Harvesting Olives?*

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Keywords: Pistiros, iron artefacts, smiting, relations between the Mediterranean and temperate Europe

Archaeologists are much pleased if, in the course of their researches, they find some exotica brought from far away and consider them being the most important documents for studying distant relations. Though they may be interesting not only for their own specific purposes, of much greater impact for ancient world cultures were transfers of technologies, of 'know-how'. In the field of mining, of extracting metals from ores, of metalwork and smithing technique the civilisations of temperate Europe were nearly as competent as their neighbours in the Mediterranean; this concerned notably the iron smelting, processing and smith's work in the fields which were of basic importance for the Iron Age crafts and economy in most parts of Europe and the Near East.

Thus, iron objects may provide useful information for the study of interrelations between the La Tène cultures and their more sophisticated contemporaries in Greece and Italy. In the field chiefly of personal weapons – swords and spears which were deposited in Celtic graves as symbols of social status – we are relatively well informed and they are also known from battlefields and sacked hill-forts, like from Pistiros, while arrowheads well-known from the latter sites only rarely appear in graves (cf. Bouzek *et al.* 2013b; Baitinger 2001; 2011) (Fig. 1/1–3, 5).

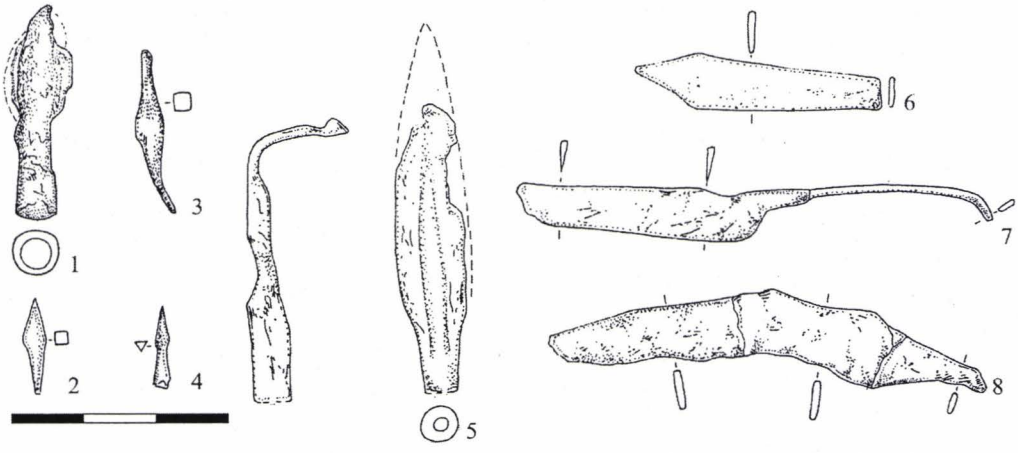

Fig. 1. Iron spearheads, arrowheads, knives and shears from Pistiros, late fourth–early third century BC (no. 4 of bronze; after Bouzek *et al.* 2013a).

* The paper was prepared in the frame of the project P 12 in the Faculty of Arts, Charles University "History in interdisciplinary perspective".

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Tools and implements were included in hoards, like at Čínov (Pl. 2), but among the Celtic monuments they are better known only from the oppida. Though the smith apparently enjoyed some higher-in-rank social position in the social hierarchy, he preferred to be represented as one of the men-in-arms.

A large number of iron artefacts are known from Greek sanctuaries (Baitinger 2001; 2011; Baitinger–Villach 2007), others from large excavations in Greek cities (for the northern Aegean cf. esp. Robinson 1944); and from Thrace as well (Bouzek *et al.* 2013b, Antonova 2013; Nikolov 1970; Stoyanov–Michailova 1996; etc.), but most of them were not conserved properly and are decaying. Moreover, in many cases even conserved artefacts have further problems and it behoves the excavator to record iron items immediately on their removal from the soil. The process of disintegration may continue even in the storeroom; much depends on the conditions of the deposit from which they have been recovered.

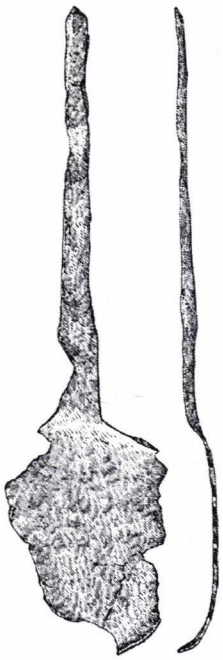

Fig. 2. Iron hearth rake from Olympia (after Baitinger–Völling 2007, pl. 29).

In trench B SW of the Eastern Gate of Pistiros in September 2013 in the Celtic destruction level a further spearhead and several arrowheads of iron were found (Pl. 1/2–3, 5),[1] of the categories already well documented in the site (Bouzek *et al.* 2013b, 256–258, fig. M 3–4). In the lower destruction debris, dated c. 310 BC, in Square B 16 NE (coordinates E-5.08/N-1.07) an unusual artefact occurred. It was lying on the floor of a courtyard together with the blade of a small (85 mm) knife (Pl. 1/4). The 261 mm long iron hook or lock (?) (reg. no. ČPI 311, found 26.9.2013) is flattened on one end; probably originally it was inserted into a wooden handle. The tip of the hook is damaged; on the bow of the hook a thick layer of rust can be observed (Pl. 1/1).

Similar artefacts have been interpreted as hooks or locking mechanisms for doors or boxes, sometimes explained as hearth rakes, notably if the tip of the damaged hook can be restored in a way similar to the Olympia rake no. 374 (Baitinger–Völling 2007, 193, pl. 29, here Fig. 2), while other similar artefacts were held for locks (Baitinger–Völling 2007, 124, pl. 46–48, notably no. 507–508). A number of other Olympia locks show other parallels to our piece, but also similar is a hook from a hoard of Early La Tène iron artefacts from Černov in Moravia (Pl. 2/8; Podborský 1993, 386–387, fig. 254; Čižmářová 2004, 199) not much less so (cf. however, other rakes e.g. Antonova 2013, 239, fig. N 2/4–6). It should also be noted that the artefact – if restored with a longer 'nose' – would be very similar to sickles used for harvesting olives both in antiquity and in contemporary times as well.

The resemblances between iron tools and devices, of which just one particular example is discussed in this note, may also be applied to many types of knives, sickles, shears (Pl. 1/6–8), axes and even nails and hooks as well (cf. Bouzek *et al.* 2013a). Such similarities are not fortuitous. At the simple level of iron weapons, tools and implements the differences between the Mediterranean and the temperate zone of Europe were only small and the two areas belonged together to a broader civilization zone with a number of traits in common (cf. Pleiner 1969; Kostoglou 2008; Nikolov 1970; Katinčarova-Bogdanova 1996).

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1 Spearhead L. 220 mm, tip and one side of the blade damaged; from square B 16 NE, spit III, N-2.41/E-4.05, two arrowheads from the same deposit, L. 48 and 35 mm.

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Baitinger–Völling 2007	Baitinger, H.–Völling, H., *Werkzeug und Gerät aus Olympia*, Olympische Forschungen 32, Berlin.
Bouzek *et al.* 2013a	Bouzek, J.–Domaradzka, L.–Gotzev, A.–Archibald, Z. (eds.), *Pistiros V, Excavations and Studies*, Prague.
Bouzek *et al.* 2013b	Bouzek, J.–Musil, J.–Ondřejová, I., Metal objects, IN: Bouzek, J.–Domaradzka, L.–Gotzev, A.–Archibald, Z. (eds.), *Pistiros V, Excavations and Studies*, Prague, 224–237.
Čižmářová 2004	Čižmářová, J., *Encyklopedie Keltů na Moravě a ve Slezsku*, Praha.
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List of figures

Fig. 1. Iron spearheads, arrowheads, knives and shears from Pistiros, late fourth–early third century BC (no. 4 of bronze; after Bouzek *et al.* 2013a).

Fig. 2. Iron hearth rake from Olympia (after Baitinger–Völling 2007, pl. 29).

List of plates

Pl. 1. 1–5. Iron spearhead, arrowheads, knife and hook from Pistiros, 2013 season; 6–8. Iron hearth rake (?), knife and long sickle from Pistiros, late ourth–early third century BC (after Bouzek *et al.* 2013a).

Pl. 2. Iron tools hoard from Černov, Moravia (after Podborský 1993, fig. 254).

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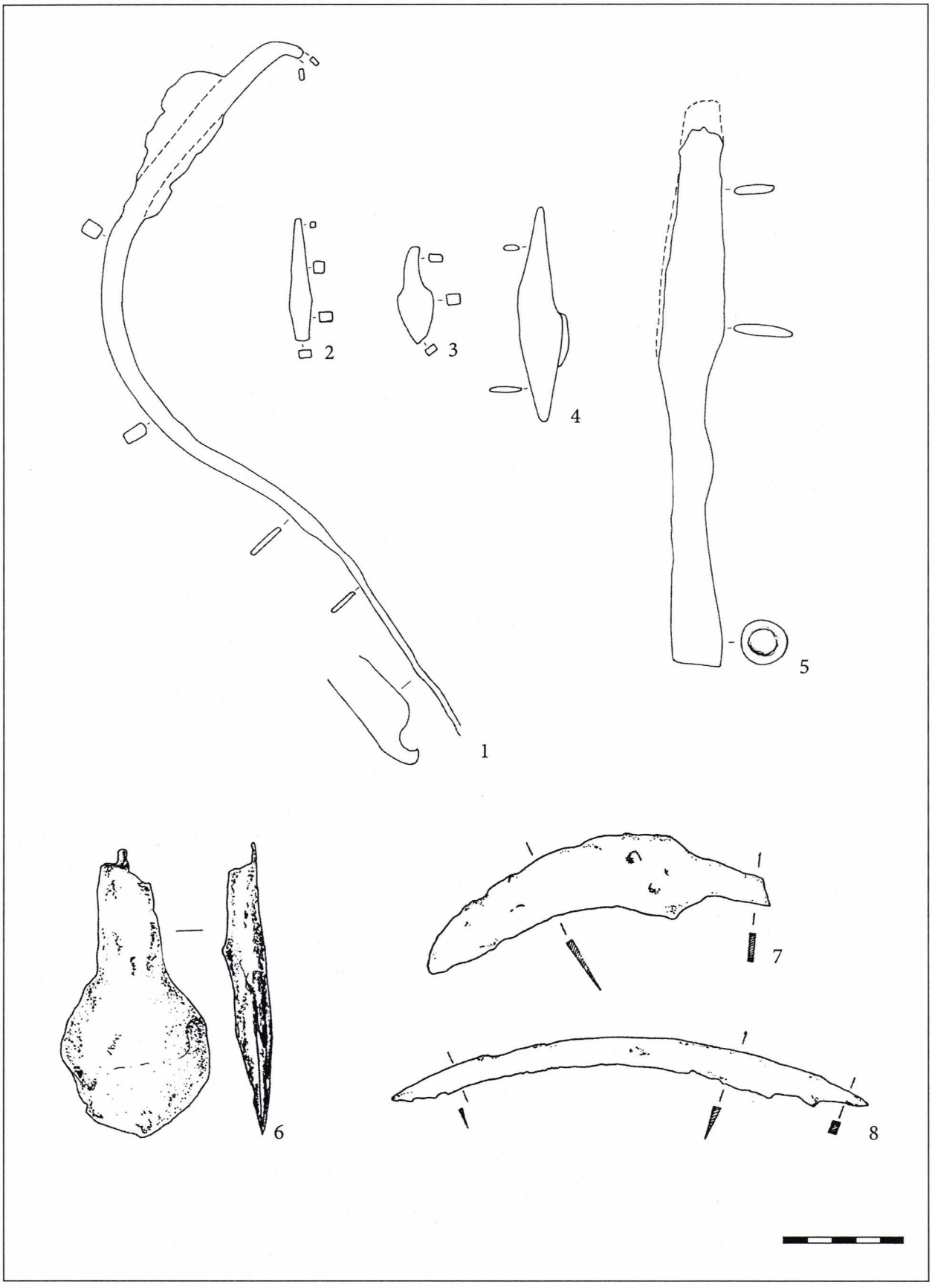

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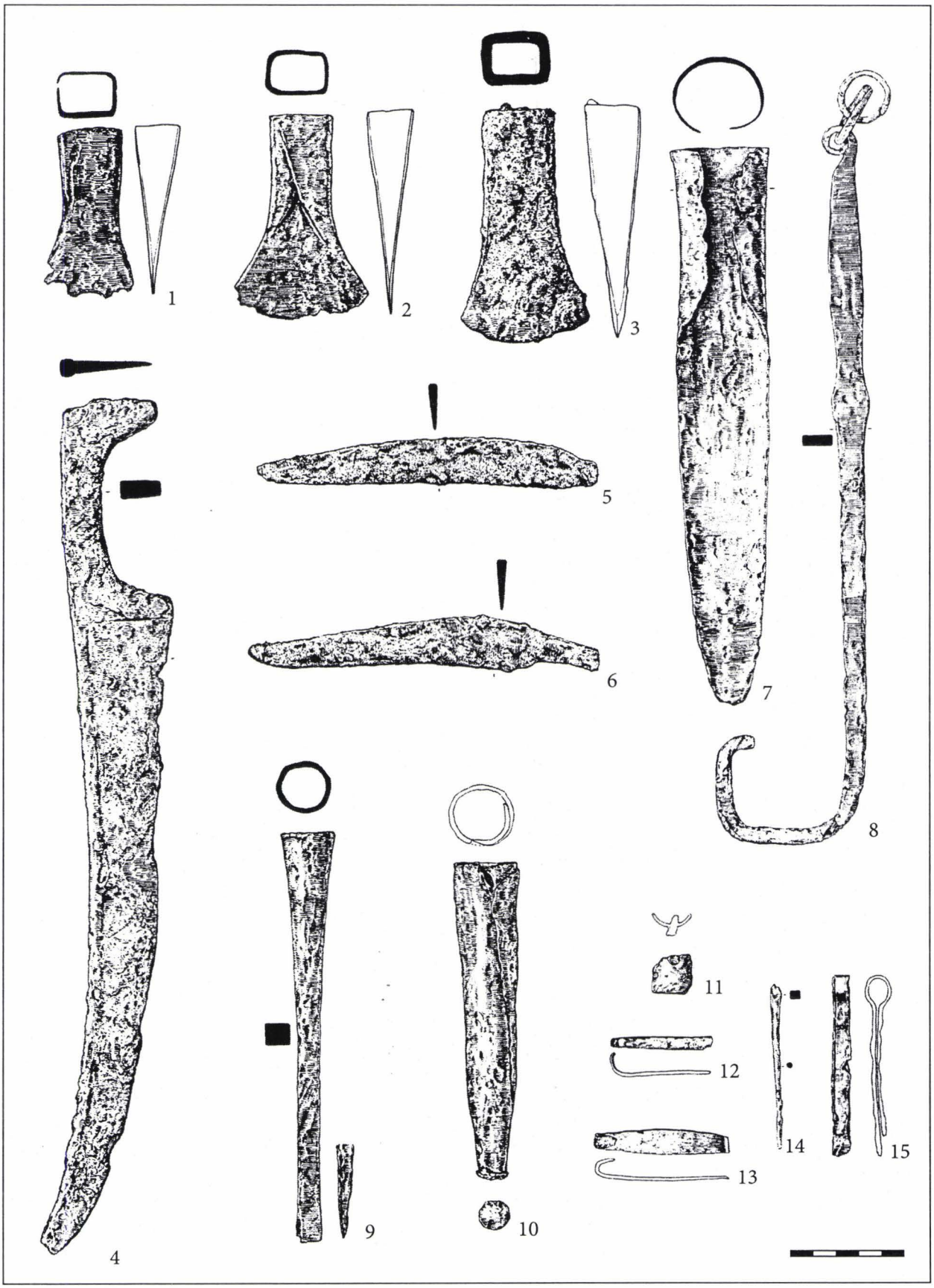

Plate 2. Iron tools hoard from Černov, Moravia (after PODBORSKÝ 1993, fig. 254).

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ABBREVIATIONS

ActaArchHung	Acta Archaeologica Academiae Scientiarum Hungaricae, Budapest
ActaArch	Acta Archeologica, København
ActaB	Acta Bernensia, Bern
ActaIA	Acta Interdisciplinaria Archeologica, Nitra
ActaMB	Acta Musei Brukenthal, Sibiu
ActaMC	Acta Musei Cibalensis, Vinkovci
ActaMM	Acta Musei Moraviae
ActaMN	Acta Musei Napocensis, Cluj-Napoca
ActaMP	Acta Musei Porolissensis, Zalău
AFN	Archäologische Forschungen in Niederösterreich
AFSB	Arbeits- und Forschungsberichte zur Sächsischen Bodendenkmalpflege
AIH	Régészeti Kutatások Magyarországon / Archaeological Investigation in Hungary, Budapest
Alba Regia	Alba Regia, Annales Musei Stephani Regis, Székesfehérvár
AnnalesUV, SAH	Annales d'Université "Valahia" Târgoviște. Section d'Archéologie et d'Histoire
AO	Arhivele Olteniei, Craiova
Apulum	Apulum, Acta Musei Apulensis, Alba Iulia
ArchAd	Archaeologia Adriatica
ArchAustr	Archaeologia Austriaca, Wien
ArchBulg	Archaeologia Bulgarica, Sofia
ArchÉrt	Archaeologiai Értesítő, Budapest
ArchHung	Archaeologia Hungarica, Budapest
ArchKorr	Archäologisches Korrespondenzblatt, Römisch-Germanischen Zentralmuseum in Mainz
ArchPol	Archeologia Polona
ArchRoz	Archeologické Rozhledy, Prague
ArchS	Archäologie in Salzburg
ArchSl	Archeologia Śląska
ArchSlov	Archaeologia Slovaca Monographiae Studia, Nitra
ArhPregl	Arheološki Pregled, Arheološko društvo Jugoslavije
ArhVest	Arheološki vestnik (Acta Archaeologica), Inštitut za arheologijo, Lubljana
Arrabona	Arrabona, a Győri Múzeum Évkönyve
ASM	Archaeologica Slovaca Monographiae
AVSC	Archeologický výskum v severných Čechách
Banatica	Banatica, Muzeul de istorie al județului Caraș-Severin, Reșița
BAR	British Archaeological Reports, International Series / British Series, Oxford
BayerVorgbl	Bayerische Vorgeschichtsblätter, München
BB	Bibliotheca Brukenthal, Sibiu
BerRGK	Bericht der Römisch-Germanischen Kommission
BFA	Bochumer Forschungen zur ur- und frühgeschichtlichen Archäologie
BIA	Bulletin of the Institute of Archaeology
BJ	Bonner Jahrbücher

Iron Age Crafts and Craftsmen in the Carpathian Basin, 2014, p. 325–328

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BMAK	Biblioteka Muzeum Archeologicznego w Krakówie
BMB	*Biblioteca Muzeului Bistriţa*
BMM	Bibliotheca Mvsei Marisiensis, Seria Archaeologica, Târgu Mureş / Cluj Napoca
BMN	Bibliotheca Mvsei Napocensis, Cluj-Napoca
BMP	Bibliotheca Mvsei Porolissensis, Zalău
BpRég	Budapest Régiségei, Budapest
BT	Bibliotheca Thracologica, Bucureşti
BTMM	Budapest Történeti Múzeum, Műhely
CAB	Cercetări Arheologice în Bucureşti
CAJ	Cambridge Archaeological Journal
Carpica	Carpica, Muzeul Judeţean de Istorie şi Artă „Iulian Antonescu", Bacău
CCA	Cronica Cercetărilor Arheologice din România
ComArchHung	Communicationes Archaeologicae Hungariae, Budapest
Crisia	Crisia, Muzeul Ţării Crişurilor, Oradea
CurrA	Current Anthropology
Dacia (N.S.)	Dacia, Recherches et décuvertes archéologiques en Roumanie, I–XII (1924–1948), Bucureşti; Nouvelle série (N. S.), Dacia. Revue d'archéologie et d'histoire anciene, Bucureşti
DissPann	Dissertationes Pannonicae, ex Instituto Numismatico et Archaeologico Universitatis de Petro Pázmány nominatae Budapestinensis provenientes, Budapest
DMB	Dissertationes et Monographiae Beograd
ÉC	Études Celtiques, Paris
EJA	European Journal of Archaeology
EphemNap	Ephemeris Napocensis, Cluj–Napoca
FAB	Folia Archaeologica Balkanica, Skopje
FAM	Fontes Archaeologiae Moravicae, Brno
FAS	Fontes Archaeologiae Slovakiae, Bratislava
FBBW	Forschungen und Berichte zur Vor- und Frühgeschichte in Baden-Württemberg
FolArch	Folia Archeologica, a Magyar Nemzeti Múzeum Évkönyve, Budapest
FÖ	Fundberichte aus Österreich, Wien
Godišnjak	Godišnjak Centra za Balkanološka Ispitivanja Akademije Nauka i Umjetnosti, Bosne i Hercegovine, Sarajevo
Germania	Germania, Frankfurt am Main
Glasnik ZM	*Glasnik Zemaljskog Muzeja* Bosne i Hercegovine u Sarajevu
HOMÉ	A Herman Ottó Múzeum Évkönyve, Miskolc
IA	Internationale Archäologie, Buch am Erlbach, Espelkamp, Rahden/Westf.
Instrumentum	Instrumentum, Bulletin du Groupe de travail européen sur l'artisanat et les productions manufacturées dans l'Antiquité
IPH	Inventaria Praehistorica Hungariae, Budapest
Istros	Istros, Buletinul Muzeului Brăilei, Brăila
JAA	Journal of Anthropological Archaeology, Amsterdam
Jahrbuch KF	Jahrbuch für Kleinasiatische Forschung
Jahrbuch RGZM	Jahrbuch des Römisch-Germanischen Zentralmuseums Mainz
JahrMV	Jahresschrift für Mitteldeutsche Vorgeschichte, Deutscher Verlag der Wissenschaften for the Landesmuseum für Vorgeschichte (Halle), Berlin
JahrOM	Jahrbuch des Oberösterreichischen Musealvereines, Linz
JAMT	Journal of Archaeological Method and Theory
JAS	Journal of Archaeological Science, London
JNES	Journal of Near Eastern Studies
KEMK	Komárom-Esztergom Megyei Múzeumok Közleményei

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KTÈMA	KTÈMA, Civilisations de l'Orient, de la Grèce et de Rome Antiques, Université de Strasbourg
Marisia	Marisia (V–), Studii şi Materiale, Târgu Mureş
MatANH	Materiały Archeologiczne Nowej Huty
MatArch	Materiały Archeologiczne, Kraków
MatBV	Materialien zur Bayerischen Vorgeschichte
MatStar	Materiały Starożytne (i Wczesnośredniowieczne)
MFMÉ	A Móra Ferenc Múzeum Évkönyve, Szeged
MHB	Monumenta Historica Budapestiensia, Budapest
MIA	Monographiae Instituti Archaeologici, Zagreb
MittAGW	Mitteilungen der Anthropologischen Gesellschaft Wien
MittAIUAW	Mitteilungen des Archäologischen Instituts der Ungarisches Akademie der Wissenschaften, Budapest
MittÖAUF	Mitteilungen der Österreichischen Arbeitsgemeinschaft für Ur- und Frühgeschichte
MittÖNG	Mitteilungen der Österreichischen Numismatischen Gesellschaft
MittPK	Mitteilungen der Prähistorischen Kommision, Vienna
MittRLW	Mitteilungsblatt aus der Vorzeit in Rheinland, Lippe und Westfalen
MΩMOΣ	MΩMOΣ, Őskoros Kutatók Összejövetelének konferenciakötete
MSVF	Marbuger Studien zur Vor- und Frühgeschichte, Marburg
MVFBW	Materialhefte zur Vor- und Frühgeschichte in Baden-Württemberg, Stuttgart
NAFN	Neue Ausgrabungen und Forschungen in Niedersachsen
OJA	Oxford Journal of Archaeology
OpArch	Opuscula Archaeologica, Arheološki zavod, Filozofski fakultet u Zagrebu
OZ	Osječki Zbornik, Osijek
Ősrégészeti levelek	Ősrégészeti levelek / Prehistoric newsletter, Budapest
PamArch	Památky Archeologické, Praha
PAS	Prähistorische Archäologie in Südosteuropa, Berlin, Kiel, München
Peuce	Peuce, Studii şi cercetări de istorie şi arheologie, Institutul de Cercetari Eco-Muzeale Tulcea, Institutul de Istorie si Arheologie, Tulcea
PPS	Proceedings of the Prehistoric Society, London
Prilozi IAZ	Prilozi Instituta za arheologiju iz Zagreba
PrzArch	Przegląd Archeologiczny, Instytut Archeologii i Etnologii Polskiej Akademii Nauk
RACF	*Revue archéologique du Centre de la France,* Tours
RadMV	Rad Muzeja Vojvodine
RégFüz	Régészeti Füzetek, Budapest
RGZM	Römisch-Germanisches Zentralmuseum, Monographien, Bonn / Mainz
RVM	Rad vojvođanskih muzeja
Sargetia	Sargeţia, Buletinul Muzeului judeţului Hunedoara, Acta Musei Devensis, Deva
Savaria	Savaria, a Vas Megyei Múzeumok Értesítője, Szombathely
SCIV(A)	Studii şi Cercetări de Istorie Veche (şi Arheologie 1974–), Bucureşti
SHN	Studia Historica Nitriensia
SlovArch	Slovenská Archeológia, Nitra
SMK	Somogyi Múzeumok Közleményei, Kaposvár
SNMP	Sborník Národního muzea v Praze, řada A – Historie / Acta Musei Nationalis Pragae, Series A – Historia, Praha
SprArch	Sprawozdania Archeologiczne, Kraków
SSA	Śląskie Sprawozdania Archeologiczne, Instytut Archeologii Uniwersytetu Wrocławskiego
SSUUB	Schriften des Seminars für Urgeschichte der Universität Bern
Starinar	Starinar, Arheološki institut, Beograd
StCom Satu Mare	Studii şi Comunicări Satu Mare

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StudiaArch	Studia Archeologiczne
Studia Hercynia	Studia Hercynia, Praha
Studia UBB	Studia Universitatis Babeş–Bolyai, series Historia, Cluj-Napoca
Študijné zvesti	Študijné zvesti, Archeologického Ústavu Slovenskej Akadémie Vied, Nitra
TAT	Tübinger Archäologische Taschenbücher
Thraco-Dacica	Thraco-Dacica, Institutul de Tracologie, Bucureşti
TübSchr	Tübinger Schriften zur Ur- und Frühgeschichtlichen Archäologie, Münster
UPA	Universitätsforschungen zur prähistorischen Archäologie, Bonn
VAMZ	Vjesnik Arheološkog muzeja u Zagrebu
VHAD	Vjesnik Hrvatskog arheološkog društva, Zagreb
WA	*Wiadomości Archeologiczne,* Państwowe Muzeum *Archeologiczne, Warsaw*
WAB	Wissenschaftliche Arbeiten aus Burgenland
WArch	World Archaeology, Oxford, Oxbow
WissSchrN	Wissenschaftliche Schriftenreihe Niederösterreich
WMBH	Wissenschaftliche Mitteilungen aus Bosnien und der Herzegowina, Wien
WN	Wiadomości Numizmatyczne
WPZ	Wiener Prähistorische Zeitschrift, Wien
Zbornik Beograd	Zbornik Muzeja primenjene umetnosti Beograd
Zbornik NB	Zbornik narodnog muzeja, Beograd
Zborník SNM	Zborník Slovenského Národného Múzea, Bratislava
ZM	Zalai Múzeum, Közlemények Zala megye múzeumaiból

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